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INCLUDING THE PROCEEDINGS OF THE ROYAL GEOGRAPHICAL SOCIETY.

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The
Geographical Journal.

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THE GEOGRAPHICAL CONDITIONS DETERMINING HISTORY AND RELIGION IN ASIA MINOR.*

By Prof. W. M. RAMSAY.

If geography be regarded as the study of the influence which the physical features and situation of a country exert on the people who live in it, then in no country can geography be studied so well as in Asia Minor. The physical features of the country are strongly marked; its situation is peculiar and unique; its history can be observed over a long series of centuries, and amid its infinite variety there is always a strongly marked unity, with certain clear principles of evolution, standing in obvious relation to the geographical surroundings.

In the first place, the Anatolian peninsula stretches like a bridge between Asia and Europe. Owing to the great barrier of the Caspian, the Caucasus and the Black Sea, all migrations between Asia and Europe must either keep the northern side, through Siberia and Russia, or the southern, along the Anatolian road. A few of the invasions of Europe by Asiatic peoples have taken the northern path; but, generally, westward moving migration and invasion have followed the southern road through Anatolia, and all westward movement of civilization which did not travel on shipboard took the same path.

* The following paper was in its inception the preface to a Report on Exploration in Asia Minor, addressed to the Trustees of the Wilson Travelling Fellowship in Aberdeen University; it merely suggests questions and indicates promising lines of exploration. Much is necessarily omitted, and I hope not to be taken as disbelieving or ignoring the considerations which I have been unable to include in a brief paper.

[Map, p. 372. We are greatly indebted to Dr. Richard Kiepert for much fresh material which has been used in constructing the map that accompanies this paper.—Ed. *G. J.*]

Of the many invasions in which Europe has retaliated and sent her armies eastward over Asia, only one of any importance has passed north of the Caspian, and that is the great movement now going on, whereby Russia is throwing her armies, her railways, and her peoples over Asia to the shores of the Pacific. Otherwise, all movements eastward from Europe, in so far as they did not go by sea—the movements of armies, of pilgrims and Crusaders, of state messengers, of merchants and trade—have followed the lines that lead eastwards over Anatolia.

In the second place, Anatolia is a bridge with lofty parapets. The roads traverse the high, hollow, central plateau, closed in by loftier mountain ridges which separate that open plateau from the sea. The parapet on the south is the vast ridge of Taurus, stretching back from the western sea into the main central mass of the great Asiatic continent, only at a few points traversable by migrations or by armies, or by the rivers that drain the plateau and flow south in deep chasms cut through the heart of the mountains. It is not meant that Taurus was ever absolutely untraversable. Men can traverse any mountains, and there are ridges more difficult than Taurus. But it is practically impassable in unfavourable weather, and during the many months when it is covered with snow; and at all times elaborate preparation and provision must be made for the crossing of a body of men. Thus in practice the roadways were few, and migrations were confined to known lines.

The mountains which form the parapet on the north, though not so strikingly continuous, and at no period in history called by one single name, are really almost as serious a barrier to confine the tides of movement to the Anatolian east and west roadway. You enter the roadway at one or other of a few points, where alone entrance is easy, and you are driven on, eastwards or westwards, according to the temporary direction of the tide. If you come from the west, you enter with Godfrey and the Crusaders at Dorylaion, or with Alexander the Great at Celænæ. Until a few years ago you entered the bridge on horseback or on foot; now you enter in a railway-carriage. You move on eastwards, and pass off the bridge by one or other of a few well-marked exits. If you come from Asia, you follow the same inevitable paths; nothing differs except the direction of your motion and the tides or the motives that impel you.

Thus the history of Anatolia has been one of startling vicissitudes, of constant variety, of rapid changes in population, in government, in the trend of development; and yet the unity amid the variety is so easy to comprehend that it may fairly be called unmistakable. The development has always lain in the action and collision of forces moving eastwards or westwards; it has never been complicated by side influences coming in from the sea on the north or on the south; it has been simply the series of phases in the immemorial conflict between Europe and Asia. The central point of that never-ending battle varies from time to

time. At one time the Greeks gather to a siege of Troy; at another the Arabs or the Egyptian Memluks storm the walls of Tarsus, defended by Greek fire or by Crusaders' axes and lances, or by that small fraction of the Armenian kingdom of Cilicia who could be induced to forget their mutual quarrels about points of ritual and to unite to save their own families against the slaughterers from the East; at another the Arabs are being beaten back repeatedly from the ramparts of Constantinople, or the Turks are pouring in through a breach. As you cast your eyes back over the past, you see Crœsus crossing the Halys to destroy a great kingdom, or the younger Cyrus the Persian leading 10,000 Greeks from Sardis to Mesopotamia, to show them how easily a vast Persian army might be scattered by a few trained and disciplined troops. You may see Louis VII. on New Year's Day in A.D. 1148, with his French Crusaders, fording hand-in-hand the unfordable Mæander, and scattering before their first charge the Turkish army drawn up on the further bank to prevent their crossing; * or Manuel with his splendid army of mail-clad warriors, European and Byzantine, jammed in that long narrow defile near Pisidian Antioch, and crushed with the stones and darts of the Turks on the hills above. If you want to see what happened when an army abandoned the few recognized paths, cast your eyes on the soldiers of the First Crusade, wandering and perishing amid the mountains of Anti-Taurus, or Frederick Barbarossa's German Crusaders struggling over the central Taurus, fed by an Armenian prince in his stronghold among the mountains, and Barbarossa himself disappearing under the waters of the Calycadnus so suddenly that his people could not believe he was dead, and long imagined that he was only waiting the proper moment to reappear in his German home. All are but small skirmishes in the great battle of East and West.

To illustrate this principle fully would be to write the history of the Anatolian peninsula. In every age, in every war, in every crisis, the opposing forces may be recognized as respectively Eastern and Western. Often, where two rivals contend for the succession to a throne or a tent, one may be recognized as champion of the East, and the other, as his opponent, attracts to his side the support of the West; and probably that would be found to rule in every such contest, though we are not always well enough informed of the facts. But the writer's 'Historical Geography of Asia Minor,' which has had the honour of being published by the Royal Geographical Society, illustrates on page after page the infinitely varied forms in which the principle has worked itself out in history (though, from its extreme brevity, it gives only the dry bones of history, into which the reader must breathe life for himself);

* This brilliant feat of arms is wrongly attributed by Gibbon to Conrad, the German Emperor, who also took part in the second crusade. On the scene, see 'Cities and Bishoprics of Phrygia,' vol. i. p. 162.

and we pass from it. I may only be permitted to say, in passing, that the experience and study of twelve years since that book was written have amply confirmed the general scheme of topographical history contained in it, and also furnished both many corroborations of details in the application of the general rules and many improvements or corrections in other details. I do not know which have given me personally greater pleasure; it is pleasant to find that one's instinct or reasoning has been right, but it is almost more pleasant to find that a mistake has been put right and a stumbling-block cleared away. The corroboration gives one confidence to go on in the path of investigation; but the correction opens a door, and often reveals a new chapter in the political or historical geography of the country. Moreover, most of the corrections have come from investigators whom I might almost venture to call pupils of my own, because they made their first essays in my company or with my advice; and it is always a peculiar pleasure to learn from men whose early steps one has helped in some small degree to direct.

One of the omissions in that book was that the importance of the mountain barriers on the north and south was not sufficiently worked out, and thus several chapters of history passed unobserved. To this subject my studies have recently been directed, and they have been illuminated by explorations which, after a long interval of ten years, I was enabled to resume by a concurrence of favourable circumstances. One point in this wide subject may detain us for a few moments.

The great mountain wall of Taurus, on the southern side of the plateau, has always been the most effectual boundary-line in the Anatolian peninsula; and this in spite of the fact that the plateau has rarely been the seat of a capital, but has generally been subject to one of the great empires of the east or the west. Many causes of course contributed to give Taurus this importance as a dividing line; but we here simply assume the fact without analyzing the contributory causes.

The ancient historical records often express the bounds of nations or of spheres of influence by the phrases "within" or "beyond the Taurus." More than at any other line, one feels that at Taurus falls the dividing-line between east and west. Even at the present day, when the whole of Anatolia outside the walls of Smyrna and the railway-lines is in a sense distinctly Oriental, one feels that when one crosses Taurus by the great pass of the Cilician Gates and descends south and east into Cilicia, one has crossed a line of demarcation, and is surrounded by a more Oriental spirit. Cilicia, as the Romans long arranged it, is more a part of Syria than of Asia Minor. In it you detect at once the impression of the Arab and the Ansarieh; you hear yourself addressed no longer as Tchelebi, which was practically universal as a title of respect before you crossed Taurus: the people now style you Hawaja, as in Syria or Egypt. That single detail is significant of the changed atmosphere that rules beyond the Taurus.

In my 'Historical Geography' the contrast between the Ægean coastlands and the rest of the great peninsula is described, the former being, as it were, a part of Greece, full of the light and the variety and the joyous brightness of the Greek lands; the rest, including the whole plateau, being, alike in geographical character and in spirit, part of Asia, impressive in its immobility, monotony, and subdued tone. But one feels inclined to draw a further distinction, and to describe the west coast as Greek, the plateau within Taurus as the Debatable Land, and the country beyond Taurus as Eastern and Asiatic. Yet the moment that one has uttered the words one feels that they are inaccurate. More than any other city, Tarsus impresses one as the meeting-place of East and West. And in history what variety is there in the lot of Cilicia and in the kind of division which Taurus marks!

In the long wars between the Byzantine, or rather the Roman, Empire and the Saracens, Taurus with Anti-Taurus divided the Romans from the Arabs for centuries, Tarsus on the south-west and Melitene on the north-east being the frontier fortresses on the Arab side. The Arabs twice attempted to advance their frontier from Tarsus over Taurus and to hold Tyana; but both the Caliphs Harun-al-Rashid and Al-Mamun, who built a mosque and stationed a garrison in Tyana, found it necessary to draw back to Tarsus before two years had elapsed. For a longer period they held Cæsareia, in their advance from Melitene; but that also they failed to hold permanently. They could never establish themselves beyond Taurus. They crossed Taurus in their annual raids, often in two raids per annum; they captured almost every city in the whole land; they thrice besieged Constantinople; and yet through more than three centuries of such war they never held a foot of land beyond Taurus outside the range of their weapons at the moment. They conquered and they passed, and the people of the land recovered from every blow with marvellous rapidity. In all history there is probably no other proof so striking of the elasticity and recuperative power that belongs to the well-knit society of an organized people, welded together by a long-established system of reasoned law and by a common religion. Roman society was too compact for the Arabs to conquer—a hundred battles and a hundred defeats had no serious effect on it. The lower civilization of a loosely knit Oriental despotism could make no impression on the fabric that Roman organizing genius had created.

But, if the Roman social fabric survived the sufferings of those terrible centuries, when Arab raids were to be dreaded every year, the suffering was terrible. The Roman civilization had weakened the stamina of the nation, and a long continuance of peace had made the general population feeble, unwarlike, perfectly content to be defended by a professional army, which had become almost a caste.

When a civilized people has lost the strength, which must in the last resort be its defence against the attack of barbarism, it is always in danger. The professional army might have been able to defend the line of Mount Taurus and keep the Mohammedan wolves from the Roman sheepfold, if the great pass of the Cilician Gates had been the only way of crossing Taurus from Cilicia. That pass, an easy road for the most part to traverse, is also a very easy one to defend at many points by even a small force. In Byzantine time it was strongly garrisoned, and a line of beacons flashed the news to Constantinople as soon as the Arabs were moving against it.

But the long-continued peace and prosperity of the Roman Empire had opened other roads. Taurus had never been an absolutely impassable barrier, and under the Roman peace many cities had grown and prospered in its highest grounds, where now no dwelling is known except a few black tents of nomads in the summer. Those cities, rich and prosperous, had improved the roads, and made it easy for the light raiding armies of the Arabs to cross the mountains. A large population of traders and artisans, clergy and schoolmasters, and other peaceful persons, was powerless before a small force of hardy barbarians, accustomed to weapons from infancy, regarding war as the one business of life and the chief duty of religion. Hence the Arab raiders could go where they pleased, ravage almost any city they chose, and easily avoid the slower regular armies of Roman trained soldiers; but they could hold nothing permanently beyond the line of Taurus.

If, at a later time, the more barbarous Turk achieved what the more polished and more fiery Arabs had failed to do, the Turkish triumph exemplified the only way in which barbarism can conquer a civilized and organized society, apart from practical extermination, viz. by breaking up the fabric and constitution of society and reducing it once more to an aggregation of disconnected atoms. As the present writer has elsewhere shown, the Turkish conquest was not achieved by battles and victories; it was gained by the nomad tribes which spread over the land, destroyed the bonds of communication which held society together, and reduced the country from the settled to the nomadic stage. The Turkish conquest meant the nomadization of the country.

That word "nomadization" opens up a great subject, and I have been asked to give more space to it than it occupied at first in my manuscript. The subject is one which, so far as I know, is hardly alluded to by the professed historians. As you read the history of the two centuries following the appearance of the Turks on the eastern horizon of the Roman Empire about 1070 A.D., you often wonder how it was that the Seljuk Turks overcame the empire. After their first great victory at Manzikert, whose character can only be guessed, their armies

were never able to meet in fair fight and on even terms a Byzantine army,* if the latter was led with any degree of prudence or skill. Yet the Roman civilization, which had resisted three centuries of continual Arab conquest, steadily grew weaker and died out before the loose, undisciplined, ill-organized Seljuk power. The story of the Seljuk conquest of Asia Minor has still to be written (for Gibbon's brief generalizations are hardly satisfactory, and Sir H. Howorth's admirable essay makes us desire a detailed study according to localities), and here it can only be alluded to in the briefest terms.

The Turkmen nomads are distinguished from the Turks proper as clearly by the Byzantine historians † as they are by the facts of the present day; and the incidental statements of those historians as to the insidious progress of the nomads over the country are very instructive. The picture that those Byzantine writers set before us has been summed up by the present writer in the following words: "The nomad Turkmens spread over the face of the land; the soil passed out of cultivation; the population decreased; the Christian cities were isolated from each other by a sea of nomad wandering tribes; intercourse, and consequently trades and manufactures, were to a great extent destroyed; and gradually the Christians in most places acquiesced, as we have seen, in the Oriental spirit and the Oriental religion of the dominant race. It is a remarkable instance of degeneration from civilized to barbarian society, and one which it would be instructive to study in detail; but the general fact is summed up in the phrase, the nomadization of Asia Minor." ‡

The great numbers of the wandering Turkmen tribes explain one striking fact in the Seljuk Empire. The many magnificent khans built by the Seljuk sultans along the principal roads that radiated from their capital, Konia, form one of the most impressive features of modern Anatolia, and are worthy of mention along with the beautiful Seljuk mosques, medressés, and tombs, as evidence of the remarkable development of architectural art in that period.

Recent German travellers describe those khans as a proof of the high stage of civilization on which the Seljuk State stood; and the latest of those travellers thinks that the khans have taken the place of similar Roman and Byzantine buildings, and conserve in their uniform

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* I speak here only of the Seljuks, not of the Osmanli (Ottoman Turks), whose Janissaries were the best force in Europe; but the Janissaries were the tax levied in brain and muscle on the Christians.

† Some evidence as to the spread of the nomadic tribes in the twelfth and thirteenth centuries is quoted in my 'Historical Geography of Asia Minor,' p. 213. See also the following note.

‡ 'Impressions of Turkey,' p. 103. The progress of the nomads in the western districts is described in my 'Cities and Bishopries of Phrygia,' vol. i. pp. 16 f., 27 ff. 299 ff.; vol. ii. pp. 372 f., 447, 598, 695.

plan the accepted method of Byzantine khans.* But this view requires serious modification. As those same travellers remark, the great Seljuk khans are almost like fortresses, with their massive walls and their single well-protected entrance. Not a trace remains of any similar Roman or Byzantine building, and this furnishes a conclusive proof that the inns and *mansiones* of the civilized empire were buildings of a much humbler and more evanescent character; private initiative then furnished sufficient entertainment for travellers without the artistic and architectural magnificence of the Seljuk khans, and forts were not needed. The khans attest a high development of art, but not a sound condition of society and government.

The truth is that such buildings as the Seljuk khans were not built or wanted in the Roman and the Byzantine period. But in the Seljuk time the caravans, which maintained trade and communication between the surviving cities of the land, required the shelter and protection of those vast fortress-like constructions,† for the roads connecting the greatest cities of the Seljuk state were unsafe. The cities were like islands in the ocean of nomadism; and the khans furnished harbours of refuge at short intervals in the dangerous voyage from city to city. If the country is safer in more recent times, the reason is that caravans and commerce were gradually destroyed on almost all roads, trade dwindled and died out, every town became perforce self-sufficient, and the empire ceased to be an articulated organism. On the few roads along which the markets of Europe still attracted a certain amount of caravan-traffic the danger continued, but where there were no travellers to rob and no trade to plunder, the nomads were either at peace or employed in mutual warfare, especially where the nomad Turkmens met the nomad Kurds. Hence the older travellers describe them all, Kurds and Turkmens alike, as unruly and dangerous, while the traveller at the present day finds them generally quite peaceful and quiet. I have spent many nights in encampments of Turkmens or Kurds in the great central plains,‡ or in Kurdish villages of the eastern parts of Asia Minor, often arriving with two or three native attendants towards sunset; yet the nomad Kurds of Galatia have the most evil reputation, and were still during the last two decades a terror to all government officials. They never showed any disposition to molest myself or my friend, though they believed us to be owners of fabulous wealth. But I confess that I sometimes felt profoundly thankful when I was safely departing from the tents of those wandering Kurds, the rudest of all Anatolian tribes.

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* Sarre, 'Reise in Kleinasien,' p. 77 f.

† "Ein äusserlich festungsartiges Gebäude" (Sarre, p. 78).

‡ The Kurds of the central plains, especially of ancient Galatia, are more thoroughly nomadic than those of the more eastern districts, so far as I have seen the latter. The nomad Kurds are the most unattractive race in Asia Minor ('Impressions of Turkey,' p. 114 ff.).

But the number of questions which open on every side when one begins to discuss that great subject of the degeneration from Roman organization to the nomadic stage in Asiatic Turkey is endless; and we must return to our proper subject for the moment, viz. the effect of the Taurus range as a division between races, as a defence of a settled people against invasion, and as a limiting wall to determine the lines of migration.

If Taurus divided Arab and Roman, Mohammedan and Christian, in the time of the Saracen wars (641–975), it was again the boundary between Christian and Mohammedan in the early Turkish period for about four centuries beginning from 1071 A.D. The Turks came in from Central Asia over Armenia, and held the central Anatolian plateau for centuries before they gained possession of Cilicia; they captured Constantinople and advanced to Belgrad before they captured Tarsus. Christian powers, Byzantines, Latin Crusaders, and Armenian princes, quarrelled with one another for possession of Cilicia. Taurus saved them from Turkish armies, but there was no such barrier on the Syrian side, and the Memluk sultans of Egypt destroyed the Christian kingdom of Cilicia. Here again the nomad Turkmen tribes, gradually spreading across Taurus and over the plains, were the true conquerors, sapping and destroying the links that held together society in the country.

Thus the effect of the Taurus as a division between nations, as well as in directing and limiting the march of armies, might in itself furnish a great subject.

Only in one case is there a district of any importance in the Anatolian peninsula which lies outside of this classification, which we have described, into central plateau, mountain-rim, and coast valleys. There is one secondary valley on the north, where there intervenes between the plateau-rim and the sea a mountain-ridge parallel to the main ridge which forms the northern boundary of the plateau. Between these two parallel ridges there stretches east and west a valley of considerable importance, forming the most fertile part of the ancient country of Paphlagonia. That valley has a history which stands entirely apart from the history of either the plateau on the one hand or of the sea-coast cities on the other. Just as you might sail and explore along the coast, and travel extensively in the northern parts of the plateau, yet never enter the great Paphlagonian valley, and remain almost unaware of its existence, so you might write a minute study of the history of the coast and of the plateau, and hardly ever have occasion to mention the intermediate valley. And yet the valley had a great history; it contained some powerful cities. The wars of the Mithridatic dynasty of kings against the Romans and the states of the West, for the most part, were fought or manœuvred along that valley. Some of the most obscure campaigns in the long wars between the kings of the Romans and the Saracen invaders seem to have taken

place in the valley, and those campaigns are so obscure because the ordinary data for interpreting the evidence by the conditions of the plateau or the coast fail us for the intermediate Paphlagonian valley. Its cities became even more important, in comparison to the rest of the country, during the earlier stages of the Turkish period, and are often mentioned.

But that long history of the Paphlagonian valley has never been written. Its many ancient towns are for the most part unknown even by name. Perhaps the task cannot be achieved, because recorded history has kept to the leading paths, and neglected the byroads; but if the task is attempted it demands a special historian, who is prepared to explore and study it by itself and for itself.

Once you have reached the plateau it is, as a rule, possible to make a road almost anywhere. Yet even there there are certain gates towards which many roads must converge, and through which they must pass. A double zone of mountains, whose old names are unknown, and which are almost nameless in modern times, runs north and south across central Phrygia, and roads must keep either to the north or the south of them. All travellers from Ephesus to the east passed by the southern end of those mountains; but travellers from Smyrna and northern Lydia generally went by the northern end. The two modern railway-lines mark the two routes.

The lofty ridge which comes up from the west, from Trojan Ida, called Temnos and Dindymos in parts of its course, approaches very close to those central Phrygian mountains, and a narrow glen, down which flows a tributary of the Mæander, divides them. That glen forms a funnel, up or down which roads and travellers going in very diverse directions must necessarily pass. For about 10 or 12 miles persons going from south to north travel side by side with others who are going from east to west. Their roads all converge to one end of the glen, and diverge again at the other.

Until that glen was noted on the map, and its importance observed, the march of the Ten Thousand, which Xenophon has described, was an insoluble riddle. In my earlier years of exploration, having only the vague, featureless, and inaccurate old maps, I found that glen a sore trial and puzzle. Filled with the desire to be constantly traversing new routes, and to avoid repetition, I found myself in the most annoying way doing the treadmill up and down the glen. In one year, when thoroughly on my guard against it and resolved to avoid it, I traversed it three times.

But this repetition only gave proper emphasis to its importance. Then it became obvious that the Ten Thousand, who had marched from Sardis towards the southern end of the central Phrygian mountains, as if to follow the southern route, and had turned backwards towards the north-west, must have traversed the glen and gone round the northern

end of the mountains. No other way was possible, and when this observation was applied, it was easy to follow the march of the Ten Thousand all over Phrygia, and to say at any point that Xenophon's foot must have trod within a few hundred yards of where we stood. At the south-western entrance to the glen stands Keramon Agora, the Market of Tiles, that peopled city; and after leaving its north-eastern exit, the eastward bound army soon found itself in the broad plain of Kaystros.

The exploration and communication along the coasts took place almost entirely, of course, by ship, and lie outside our present subject, except in so far as it affected or was affected by land conditions. The fact that at various points the mountains touched the sea, and made the coast road tedious and difficult, threw the communication more and more completely on to shipboard, and this meant that communication along the north and south coasts was for centuries entirely in the hands of the Greeks, and that the coast towns, even so far east as Tarsus and Trapezus, were strongly affected by Greek influence, and often even transformed into cities of the Greek type, with free institutions and constitutional government by elected magistrates according to published law.

Moreover, the sea was dangerous and difficult. On the north coast, the Black Sea was the most uncertain and treacherous known to the Greeks: at no period of the year could the weather be counted on; in the most settled summer weather a tempest might occur. Far back, in the beginning of Greek history, we can dimly trace the immense influence exerted on the Greek mind by the first experience of that sea with its dangers and its wonders. It is not too much to say, though here we can only make the strong statement and pass on, that the discovery of the Black Sea played as important a part in forming and training the Greek mind, in determining its bent, in moulding its literary expression, as the discovery of America has played in the modern world. But to illustrate that assertion would need a whole evening.

But the life of a country is always mirrored and idealized in its religion; and the religion of the coast cities must necessarily have been moulded a great deal by their dependence on the sea. This we can observe well on the north coast. The Ruler of the Sea, Achilles Pontarches, was the great deity of the north coast cities; an association of cities was allied in his worship, and the high priest was called by the same name as the god, the Pontarch. The god had his chosen home in that island, far out in the sea opposite the mouths of the Danube, where he dwelt with Helena, the island which occasionally appeared before the storm-tossed sailor as a haven of quiet. But he was worshipped also in all the cities, whose prosperity depended on his favour, and the sailors made their vows to him before they

sailed, and paid them after their safe return. He was worshipped in all the cities in South Russia, in the Crimea, as well as on the Asia Minor coasts; but probably his chief seat was in Sinope, that great harbour of the early time, on the promontory that juts out far into the sea. And when a new form of religion required a new expression of the old religious fact, a Christian saint was substituted for the pagan Pontarch Achilles; and St. Phocas of Sinope became the sailor's god, or at least their patron and protector.

The severance of the north coast from the plateau is thus as strongly marked in religion as in history. It would not, however, be true to say that the severance in religion was absolute. The mountain-ridges which barred and hemmed in ordinary communication offered no insuperable barrier to the spread of religion. The strange fervid cults of the plateau proved as impressive to the coastlands as they did in the European lands to which they spread in wave after wave. The divergence in the religion of the coast took the form of additions to a common religious stock—such as the cult of Achilles Pontarches.

On the south coast less is known of maritime religious foundations. The existing records show little except gods of the common Anatolian type. Yet there must have been more. Especially at Myra, in Lycia, we may look for some special sailors' cult. Myra was the harbour for the direct over-sea communication with Syria and with Egypt. This communication was not old—the early ships never ventured to desert the coast and strike boldly out to sea. But at least as early as the first century of our era, the large ships which carried the Egyptian corn to the Roman granaries habitually tried to run straight across from Alexandria to Myra. A west wind blows with wonderful uniformity in the Levant, and those ships could commonly trust to a good run due north to the Lycian coast. But if the west wind blew too strong, the ship would make too much leeway, and find itself unable to clear the western end of Cyprus; and then it was obliged, in the peculiar conditions of navigation there, to run to the Syrian coast and keep round the east and the north of Cyprus. In such circumstances the blessing of the god of Myra would be sought with special devotion; and, though this cult is not proven in its pagan form, which as we have seen was only of quite late origin, the Christian cult which took its place is well known. St. Nicholas of Myra played the same part among the sailors of the Levant as St. Phocas of Sinope did among those of the Black sea.

Phocas was a martyr of the reign of Trajan. Nicholas was Bishop of Myra more than three centuries later. The Christian form evidently established itself earlier on the north coast than on the south, and this is in strict accord with other evidence, which shows that the new religion had taken deep root in the northern coastlands by the time of Trajan, whereas on the south it was very much later in attaining such strength.

But it was not merely armies, or migrations of peoples, which have swept eastwards or westwards across Anatolia. Art, knowledge, new thoughts and new religions have trod the same path in either direction; they, too, move only westwards or eastwards across the bridge, rarely if ever northwards or southwards. Such movements, though less imposing and romantic than the march of armies and the combat of heroes, may justifiably detain our attention longer, precisely because they are less striking and more easily escape notice.

There are some apparent exceptions, which, however, vanish under more careful scrutiny, and therefore only help to emphasize the general principle. One example may here be given. The present writer is responsible for the theory (published in 1882) that the Greek alphabet, after travelling by ship with the Ionic Grecian merchants to Sinope, penetrated thence southwards across the mountains into the central plateau, where we find it in use east of the Halys about the seventh century B.C. But after further study he retracted this theory, and argued that the Greek alphabet went up eastwards from the west coast, in the ordinary course of trade and political relations; and dated that communication by the recorded fact that a king of Phrygia was married to a daughter of Agamemnon, King of Æolic Cyme, about 700 B.C. Historic tradition remembered that dynastic fact—a striking example of the way in which a royal family embodies and represents the history of its nation—and the union of the two royal families stands to us for the intercommunication between the active Greek cities of the west coast and the peoples of the plateau, in the course of which the alphabet and many other ideas passed eastwards or westwards. That second theory may now be regarded as the accepted view. Even those English scholars who accept nothing in history but what is printed in German may accept this view with easy minds, because it has been rediscovered independently by a learned and able young German professor, who began to travel in Anatolia about eight years after the second view had been published and republished in the *Journal of Hellenic Studies*, and soon found out and made known the truth, gently rebuking the error of the English scholar who had advanced the first theory.

Such movements of thought and religion are complicated by a new factor, the influence of the land: those movements did not merely sweep across the country like armies from one side or the other; sometimes they originated in the country; sometimes they were modified, profoundly or slightly, as the case might be, in their passage. An army may march across the country, gaining no material strength, but merely losing part of its force; but even an army may learn something in its long travels, and those who return to their own land may, like the remnant of the Crusaders, come back wiser and better able to understand the world than when they started.

This influence, this new factor, may take one of two forms. In the

first place, it may arise out of the situation of Anatolia as a bridge and meeting-place between Eastern and Western ideas. When the thoughts and knowledge of two diverse peoples meet, either in alliance or in hostility, the result is not to be represented as a simple addition. Ideas are not like dead matter to be placed side by side: they unite and are productive, or they die; but they cannot remain inert and unvarying. The result of their meeting may be, and commonly is, more like a process of multiplication; occasionally, it is a process of division or destruction. For example, the invention of the art of coinage is attributed to Asia Minor by Herodotus; and modern opinion agrees unanimously with him. In the great highway of commerce and intercourse it was natural that this idea of a common measure of value, guaranteed by a trustworthy authority, should be struck out. Along with this invention we may refer to the speculation of M. Radet *—one of the most brilliant pages of his striking work on Lydia—that the organization of trade and caravans and bazaars, the typical Oriental method of commerce, belongs to the same country.

Similarly, the development and improvement in practical working of many ideas springs from the intercourse and jostling of many men and many minds along the great bridge. The simplification of chronological reckoning by the use of a definite era, so that a date can be expressed by a single number, may belong to Asia Minor; it became common, and probably it originated, in the adapting of Greek ideas to a wider sphere of practical life, which occurred after Greece went forth under Alexander the Great to conquer the East, when it settled down under his successors to the great practical problem of how to rule the conquered world. The cumbrous method of dating by the annual magistrates of the city, which commended itself to the patriotism and pride of the Greek citizen in Greece, became too obviously unworkable in the wider sphere of the Hellenized East. In no part of the ancient world is the custom of expressing dates by counting from a fixed era more firmly established in common everyday use than in one district of Asia Minor, embracing the eastern part of Lydia and western parts of Phrygia.

But, in the second place, there is a growing opinion among the most recent investigators—an opinion strongly held by the present writer—that Anatolia was not merely an intermediary, developing foreign ideas in a practical way, but also played a not unimportant part as an originator. We are inevitably forced back to a time when Anatolia was not merely a bridge between opposite lands and great peoples, but was itself the centre of a great empire exerting an influence on the outer world. The empire is closely connected with the most fascinating and

* Criticized and accepted with some modification in the writer's 'Cities and Bishoprics of Phrygia,' vol. ii. p. 416.

the most obscure historical problems which are at the present time under discussion. Every step that is being made in the rediscovery of the early Greek world, and the history of early intercourse in the Eastern Mediterranean lands, constitutes at the same time indirectly an advance in the history of the ancient Anatolian world, even though the discoverer is not conscious of the side light which he is throwing on that subject. Twenty years ago that empire was not even dreamed about by any one; even yet it is almost an unknown quantity, which is to be estimated from its effects more than from direct evidence about its actual nature. But the direct evidence is slowly being discovered—very slowly, because there is no organized effort being made to discover it, but mere sporadic experiments by occasional travellers, generally inexperienced, who, as soon as they acquire experience and grow enthusiastic in the investigation, are drafted off to other spheres of life. But still discovery, though slowly, does progress; and what was reckoned only a dream ten years ago by many, is now an admittedly real factor in history, which has an acknowledged place in every modern discussion of the early Mediterranean world, and which, after ten or twenty years, will occupy far greater space than it does now. An ancient system of writing in hieroglyphics, different from any other known system of expressing thought by visible and permanent symbols, is known in Asia Minor through a long process of development, and is dimly traceable as an influence on other countries. Characteristic Anatolian artistic forms have been studied and specified by several investigators, though still they are chiefly evident as the unknown factor needed to explain the development of the East Mediterranean world. Most certain and most typical of Anatolia is its religion, the influence of which on the Greek and Roman world is the one form in which Anatolian influence has been long recognized by modern scholars. This they could hardly fail to do, seeing that the ancients themselves acknowledge it, describe it, and inveigh against it; but still it was left to comparatively recent scholars to show how far-reaching and long-continued that influence was; and among those scholars the most acute and able has probably been Mr. P. Foucart, formerly Director of the French School of Athens,* who writes of Anatolian religion entirely from the Greek point of view as being an outrage on the Greek spirit, relieved from being abominable only by becoming sometimes ridiculous in its fervour. But at least the fact is established that this influence spread in wave after wave of a sort of religious revivalism over the classical world, mostly among the uneducated classes, but still often affecting the population so profoundly as to receive State recognition or require State regulation and even coercion. For good or for evil, it was at least enormously powerful.

* 'Les Associations Religieuses chez les Grecs,' 1873.

In all these departments, writing, art, religion (and doubtless others might be added), there is perceptible a connection with the geographical character of the country. Elsewhere the present writer has argued* that the hieroglyphics must have been originated on the great central plains; and he believes that an important part in the domestication of certain animals must be assigned to the same localities. The soil of those now desert plains is generally highly fertile. Only the application of water and skill is needed to make them very fruitful; and the ruins of large and rich cities are found where now the country is absolutely barren. The arts that were needed to utilize those wide plains were all embodied and taught in the religion of the country. The domesticated animals were all sacred, and the treatment of them was prescribed as part of religious ritual.

As might be expected, therefore, it is in religion that the direct influence of geographical features is most obvious. Ancient religion was far more intimately and universally associated with social and family life than is the case with modern European nations. Religion had made and ordered all social relationships. The individual was bound in the ties of religion from his cradle to his grave. Every act of his life, good or bad, joyous or mournful, moral (to our conceptions) or immoral, was equally presided over by a divinity, and, as it were, done under the divine sanction. The early religion of Anatolia was therefore the outcome of the whole circumstances and environment that acted on the people.

One feature in the Anatolian religion rises before us prominent and impressive at the first glance. The ordinary and familiar idea is that God is the Father of all mankind and all life. Such is the almost universal European and Semitic conception. But it was the motherhood of the divine nature that was the great feature in the Anatolian worship. The male element in the divine nature was recognized only as an occasional and subsidiary actor in the drama of nature and of life. The life of man came from the Great Mother; the heroes of the land were the sons of the goddess, and at death they returned to the mother who bore them.

In the social customs of Anatolia, even after it was overspread by Greek manners and Greek ideas, many traces remain of that primitive idea. Descent was sometimes reckoned through the mother; women magistrates are frequently found even in the Hellenized cities of the land. And in its history the same impression remains: it is everywhere the most pathetic of histories. Not vigour and initiative, but receptivity and impressibility, swayed the spirit of the people, marked their fate, and breathed through the atmosphere that surrounded them—a continuous, barely perceptible force acting on every new people, and subtly

* 'Cities and Bishoprics of Phrygia,' vol. i. p xv.

influencing every new religion, that came into the land. For example, the earliest known trace of the veneration of the Virgin Mary in the Christian religion is in a Phrygian inscription of the second century; and the earliest example of a holy place consecrated to the Mother of God as already an almost divine personality is at Ephesus early in the fifth century.

On the great level plains of the central plateau the spirit of man seems separated from the world by the mountains, and thrown back on its own nature; but it is not confined, for the idea of confinement is absolutely alien to that vast expanse, where the sole limit to the range of the human eye seems to be its own weakness of vision, where a distant mountain-peak only emphasizes the sense of vastness because it furnishes a standard by which to estimate distance. The great eye of heaven, unwearying, unpitying, inexorable, watches you from its rising over the level horizon till it sinks below the same level again. There is a sense of rest, of inevitable acquiescence in the Infinite Power which is around you, all-pervasive and compelling. The sense of individuality and personal power grows weak and shrinks away, not daring to show itself in the human consciousness. The phases of the year co-operate in this effect, with a long severe winter and a shorter but hot summer. Where water pours forth in one of the many great springs which give birth to strong flowing rivers, the country is a garden; but otherwise the fertile soil is dependent entirely on the chances of an uncertain rainfall. The north wind tempers the heat, and the harvester trusts to it entirely to winnow his grain on the threshing-floor. Everything impresses on the mind the utter insignificance of man and his absolute dependence on the Divine power. The peasant of the present day still calls every great life-giving spring "God hath given."

But the Divine power that was so evident was not the stern, inexorable power of the hard desert. The people saw the nature of the land, rich and full of good things to those who accepted the divinely revealed method, and cared for the holy soil and the sacred animals, as the goddess, their mother and patron, required. St. Paul, with his usual unerring insight into the character of his audience, spoke to the rude Lycaonian peasants about the God "who did good, and gave rain from heaven, and fruitful seasons, filling the heart with food and gladness."

For the student of that country and history, it is always and everywhere necessary to go back to that religion, to recognize it as the originator of all national life and of all social forms, and as a continuous force acting throughout the later development of the country.

In the exploration of the city of Ephesus an example may be found of the use that might be made of this principle. Mr. Wood spent six years searching for the site of the Temple of Artemis, and at last he found it exactly where it ought to be, beside the little hill on the top

of which was built the great church of St. John, and on the lowest slope of which is the splendid mosque of Isa Bey. The church was the largest built by the Emperor Justinian, that greatest of builders with the single exception of the Emperor Hadrian.

The historical process is obvious, since Mr. Wood's discovery disclosed it. The dominant Christian religion had to claim for itself the sanctity attaching to the ancient site. It did so by building that great church overlooking the temple. But Christianity gave place to Mohammedanism, and again this new religion made itself heir to the religious associations and holiness of the locality by constructing between the two older religious sites one of the largest and most splendid mosques in the whole country.

The history of Ephesus is an extraordinary series of vicissitudes, but the religious centre is always the same. The Greek city was at a distance from the religious centre; it aimed at commercial or military advantages, and its site was changed more than once as the sea-coast receded. The holy place was the governing centre of the plain before the Greeks came; its priests watched the Greek cities grow and change and decay. The outward form of the religion was altered, but the old belief was not extirpated, and it took new root in the heart of the conquering religion, so that in the fifth century we find the legend of the Virgin Mother of God firmly established among the Christians of Ephesus, though it was not strong enough to obliterate the historical fact that the Holy Theologian had lived many years and died in the city. But the belief in the old holy place was a force always attracting the population thither, and growing stronger as the standard of education in the Eastern Church degenerated, and at last proving irresistible. Thus the centre of population was moved back to the old centre of religion. The old Asiatic paganism had proved too strong alike for the Greek trade and education and for the Christian teaching. The Greek spirit had come, and lived for twelve hundred years, and died of weakness, but the old beliefs continued as strong as ever. The old goddess had not merely her home in the open plain among the haunts of men; she was the goddess of wild nature and nursing mother of all wild animals, and she had her other home among the mountains on the south of the plain. And so among the Christians the home of the Virgin Mother of God was discovered and made a centre of worship and pilgrimage near the old mountain house of the Goddess-Mother.

An apparent exception to the principle that the great movements of history and thought must either keep to the coast-lines or to the central bridge, and that no great movement on the central plateau ever springs from the northern or the southern coast, is presented by the enterprise which carried the first Christian mission from Perga on the Pamphylian coast to Pisidian Antioch and the neighbouring towns on the central bridge. The theologians have disputed, and will doubtless dispute to

the end of time, about that sudden transition; but the geographer and the historian who study facts instead of starting from theories can never hesitate as to this great fact. The first mission movement began to work its way westward along the sea-route by Cyprus and the Pamphylian coast; and at this point it deserted the coast-route and transferred itself to the far more fruitful and important land-route over the central bridge. The important movements of thought had almost always taken the land-route, for the coast-route affords only narrow and limited opportunities along its course. It was easy for the pioneers of new ideas to carry them by sea from the Syrian shore to Athens or to Rome; but by the way they made no impression and left no seed. On the other hand, along the land-route new religious movements worked their way by conquering the cities and the peoples through which they passed: they planted themselves firmly at each stage, and each step was the preparation and the basis for a further step.

Of the many movements of thought that have occurred along the great bridge, the only one which can be traced in any detail is that by which Christianity was diffused over the country and into Europe; and it would be an instructive example of the principles which have just been laid down to study that important movement. But it would need a separate article to do so even in the briefest outline. One may only say here that the current conception, which indicates the spread of that movement by a series of lines radiating from Syria across Asia Minor to the north, north-west, and west, is entirely incorrect. The movement of thought was along the great bridge, by the road on the southern side of the plateau, direct west from Syria to Ephesus, and then back again in return waves along the north coast by sea, and along the northern roads over the plateau by land. And probably the older movements, about whose diffusion we have no information, exemplified equally the same geographical laws.

Before the reading of the paper, the PRESIDENT said: This is not the first time that we have had the pleasure of welcoming Prof. Ramsay in this room. I am proud to say that our Society has had a great deal to do with the extremely valuable work of the Exploration Fund in Asia Minor. I now call upon Prof. Ramsay to read his paper.

After the reading of the paper, the following discussion took place:—

The Rt. Hon. JAMES BRYCE: I feel great diffidence in saying anything upon the most interesting and instructive paper which we have heard from my friend Prof. Ramsay, because I see present several accomplished travellers whose knowledge of Asia Minor is far more extensive and profound than any I could claim. Among others I see Sir Charles Wilson and Mr. Hogarth, who both know Asia Minor thoroughly, and are undoubtedly more competent to speak of it. My knowledge is slight, and is practically confined to the north and west coasts. I have never had a chance of travelling over the central plateau which gives its distinguishing character to Asia Minor as a whole. The paper seems to me an admirable illustration of the way in which history should be studied in connection with geography.

It lays down the bold lines which determine the character of the country, and it brings these into association with the successive movements of religion, of politics, and of commerce by which the whole history of the country has been determined. If we could make historical study start from a thorough knowledge of the geographical conditions and physical structure of a country, we should make it incomparably more valuable as a means of general mental training and as a basis for all kinds of human knowledge than it has yet been in most places made. One could wish nothing better for those who are endeavouring to secure for geography its proper place in education than that they should read and meditate on such a paper as Prof. Ramsay has given us. One felt, in listening to his paper, how much freshness might be given to historical teaching were it made to begin from a study of mountains and valleys, and to show how these determined the succession of events. I was reminded by some passages in his address of another remarkable plateau, also the home of an early civilization, also the scene of great events—I mean the great plateau of Mexico, which in some respects bears a similarity to Asia Minor in the character of its elevation, in the abruptness of its declivities, especially towards the east, and in the contrast between the early populations which inhabited the upper levels of the plateau and the populations which dwelt below. But, unfortunately, our historical knowledge of what passed before the Spanish conquest is so slender, and the natural course which American history would probably have taken was so completely interrupted by that conquest, that one can simply suggest the analogy. As respects the destruction of the prosperity of Central Asia Minor by the incoming of the nomads, while expressing no disagreement with Mr. Ramsay's view, I should be disposed to add that the decline in the machinery and administrative organization of the East Roman monarchy was a concurrent cause, accelerating the process which the paper describes. I was much struck by another remark which Prof. Ramsay made in the latter part of the paper, where he referred to religion in Asia Minor. He pointed out that one of the ancient civilizations which must have had most influence, but about which we know least, had its original source in the plateau of Asia Minor at a time practically anterior to any recorded history, at a time before the growth of the Lydian Empire, and contemporaneous with the earlier Babylonian Empire. And he passed on to speak of the religious influences which had their origin on this great plateau. It struck me, in listening to his observations, that it is a noteworthy fact that all the great religions of the world have originated among peoples not connected with the sea. If we take the great historical religions, such as Buddhism, the religion of ancient Egypt which had an enormous importance for the ancient world, the religion of the Hebrews, the religion of Persia from the time of the Zend Avesta to modern Parsiism, Christianity and Islam, you will see they all originate with peoples who have little or nothing to do with a seafaring life. There seems to be truth in Prof. Ramsay's suggestion that it is intensity which makes the power and strength and permanency of a religion. It is not susceptibility to new ideas which makes a religion powerful, enabling it to lay a strong grasp upon the mind of the nation in whose midst it grows up, and rendering that nation able to communicate to others the faith which has had power over itself. The religions which sprung up in races connected with the sea, of whom we may put the Greeks and Phœnicians as examples, although they obtained local influence, never exercised the same wide sway over the hearts and minds of men, never had the same permanency and strength. And among these intenser forms of faith, although we know least about it, we may perhaps reckon the religion whose primal seat is usually attributed to Phrygia. There can be little doubt that the religion of Phrygia embodied in the worship of the Great Mother must have had a very

powerful influence not only upon the familiar worship of Greece, but upon that curious under-current of Greek religion which concerned itself comparatively little with the Olympian deities, but showed its power in the so-called mysteries and various other recondite ways. There are, indeed, traces of its influence upon early Christianity also. I cannot help hoping that the ideas he has given us on this topic will hereafter be worked out more fully than in the extremely interesting but necessarily concise paper with which he has favoured us to-night.

Sir CHARLES WILSON: I can only echo what Mr. Bryce has said with regard to the importance of Prof. Ramsay's paper. You may have noticed that it is very different in character to many of the papers which are read in this theatre. Prof. Ramsay has never once mentioned himself or any of the dangers and difficulties of travelling in Asia Minor, but his paper is a very important contribution to the history and geography of that country. It is impossible, or very difficult, to criticize the generalizations which he has made; but you have the result of over twenty years' study of the country, instead of, as we often have had in this theatre, a record of personal adventure, or diary of exploration. There are few points upon which I wish to say anything. One is with regard to the nomadization of Asia Minor. We have contemporary records of the way in which the nomads devastated the country. They cared nothing for town life; all that they thought about was food for their flocks and herds. For three centuries a succession of nomad tribes passed through the country; they ate up everything as they went; they cared nothing for agriculture, or whether the people in the towns starved or lived; and they entirely ruined perhaps one of the richest countries in the world. I think that Prof. Ramsay has placed the ruin of the country by the nomads a little too early. I should be inclined to attribute it to the passage of the Mongols through Asia Minor, and all that the Mongols left behind them was swept away by the advance of Timur and his Tartars. But I entirely agree with him as to the way in which the towns were isolated by the advance of the nomads, and the difficulty of keeping up communication between town and town. I may perhaps mention that the Seljuk Turks, who must be distinguished from the Osmanli Turks who followed them, were not only great builders of khans, but of other public buildings. I do not think anything impressed me more, as a mark of the great power and architectural skill of the Seljuks, or rather of the foreign architects employed by them, than the great works at Alaya, on the south coast of Asia Minor, which I might almost call the Portsmouth of the Seljuk Empire. The slips and other buildings connected with the navy of the Seljuks were built in the same solid manner as the beautiful khans which are scattered over the country. So also with regard to the mosque architecture. I think the style of architecture in the Seljuk mosques and in the Medressehs, which they built throughout Asia Minor, is one of the most beautiful that I have seen. I remember bringing it to the notice of the late Mr. Fergusson, the well-known architect, to whom it was unknown; and even now we have little information respecting the details of these beautiful buildings. With regard to the importance of the Taurus as a dividing range, I may perhaps notice a fact which Prof. Ramsay did not mention. In the last century the range was the boundary between the territories of Egypt and those of the Turk for about nine or ten years. The Egyptians, who had advanced as far as Kutaya in Asia Minor, whence they were obliged to retreat by the European Powers, had their boundary at Mount Taurus, and there are still in existence, in the great pass of the Cilician gates, the forts which were thrown up by Ibrahim Pasha as a defence against the advance of the Turks into Cilicia. I may perhaps mention that Prof. Ramsay intends to visit Asia Minor again this year. There is one particular investigation which Prof. Ramsay has been very anxious

for many years to carry out, and in which he is extremely interested—the excavation of the site of Lystra, which is well known. Very important results may be expected from such exploration, and I hope that in a not far distant future, funds may be subscribed to excavate that very ancient and interesting biblical site. I think that Prof. Ramsay's paper is one of the most important which has been read for some time in this theatre.

Mr. D. G. HOGARTH: Certainly Prof. Ramsay's ideas do not belong to that dead matter of which he has spoken. The points which struck me most are those which concerned the question of the nomadization of Asia Minor; many of them were so obvious, when they had been said, that one wonders they had never been said before; but so far as I know they have not, but they now seem to me to be final. I was specially interested in that suggestion of how a barbaric society can split up a society very much stronger, more organized, and more ancient than itself. Of course, in a paper so full of ideas, there are some which are sure to provoke a certain amount of criticism. There are two particularly which I should like Prof. Ramsay, if there is time, to say a word more about: one is the main idea of the paper—the significance of the Taurus. I do not really mean to criticize the main contention that the Taurus is an extremely important mountain range, but I am not quite certain whether it has accounted for quite as much as Prof. Ramsay seemed to indicate. I have various reasons. He spoke of Cilicia being an Oriental country in strong distinction to anything on the other side of the Taurus; but I would venture to remind him that Cappadocia and Pontus had a very strong Oriental colouring from an early time. Furthermore, as he knows, and as I have had reason to know, and still more Sir Charles Wilson has had reason to know, the Taurus is far from an impassable range. It is, on the whole, an easily passed range; it contains almost the easiest pass in the world—that is to say, the easiest if not defended by a hostile army—and it has often been, as a matter of fact, passed by empires, by armies, and by nations in the past. I would only call attention to one fact, and that is that Asia Minor was for a long time part of an empire which had its centre in Syria. There was at that time no very impassable barrier in the Taurus range, and although it is quite true that the Arabs never succeeded, although they often passed the Taurus, in holding land on the other side, I would ask whether that is necessarily due to the impassable nature of the wall-like Taurus, or whether it may not be partly due to considerations of latitude and of sea-level? The nomads who came into Asia Minor came for two main reasons. Their perennial unrest is due to the fact that there are very large tracts of country in Asia which are of a lean character. These nurture and raise a hardy population which rapidly increases, but for whose increase the land does not provide sufficient subsistence. They are, therefore, always moving. They move like air—where there is a vacuum. Asia Minor has provided that vacuum, and they have moved towards it from the two main areas, the one being the Central Asia area, the other being the Arabian area. Though it is true that the nomads who came into Asia Minor did come from the northern area, I would ask whether that is really due to the greater ease of communication, or rather to the fact that those who came from the Arabian area were unfitted by the latitude in which they had been born to effect any permanent lodgment on so cold an area as the Asia Minor plateau. The other point—and here we are very much in the region of conjecture—was connected with that interesting section towards the close of his paper, when he spoke of the possibility that Asia Minor had not always been a bridge, but had been itself the source of certain strong influences, and, as he indicated, perhaps of a very considerable independent empire in very early times—that is, the empire which has been dimly indicated

for some time past by what are called the Hittite monuments. Though I do not deny the fact that Hittite monuments are spread over Asia Minor and are monuments of very great importance, I am not sure whether we have reason to say the centre of that empire was in Asia Minor. It would be very difficult to accept that without strong proof in face of the fact that in historic times no empire had its seat in that country. It is a very significant fact that the main successor of Alexander, as soon as he aimed at anything more than a small government, passed out of Asia Minor, and established the centre of his empire, not in Asia Minor, but in the north of Syria, and there his successor built the most famous city of Hellenistic times. Therefore, what we find is, that while armies and kings were continually passing through Asia Minor, while great battles were fought in Asia Minor, at every one of which an empire was lost and an empire was born, at the same time, after those battles the victor did not establish himself in Asia Minor, but passed to one side or the other. That being the case, it raises a strong presumption, there being no authority where we can get any information—it raises the presumption that the centre of "Hittite" empire was not in Asia Minor, but was in one of the more fertile regions to the north-west or the south-east. Asia Minor is, of course, a rich country up to a certain standard, but I doubt if it can be put into competition with the valley of the Orontes or the Rumelian plain. That is why it has been used as a bridge rather than as the centre of a new power. Before I sit down, perhaps I might be allowed to refer to almost the last paragraph of the paper, the section in which Prof. Ramsay deplores the fact that those who go into Asia Minor have so soon to leave it. His own career has been a great example of what an extraordinary benefit it is to geographical knowledge that one person should be able to study one particular subject for a considerable time. We in England who do all these things by private enterprise, and have nothing to do with the Government in the matter, are very severely handicapped. It is only when these kind of enterprises are supported by a government that it is possible to carry them out with any continuity. I have nothing, not a word, to say against this Society, and nothing but praise for the members. The Society has most nobly helped the work in Asia Minor for many years, not only by making grants towards the actual travelling, but by the still more difficult and expensive work of supporting the publication. The great work Prof. Ramsay brought out some ten years ago, 'Historical Geography of Asia Minor,' is a monument both to himself and this Society. It is not for me to say one word about public bodies and the character of this Society, but I do wish something could be done by which the Government could be interested in this matter, and could secure to Prof. Ramsay, and people like him, some continuity for their work in a country like Asia Minor.

The PRESIDENT: With regard to the 'Cilician Gates,' isn't it the fact that Ibrahim Pasha opened it up?

Mr. HOGARTH: He opened the passage—made it wider.

Sir HENRY H. HOWORTH: The only possible claim that I have in any way to say a word upon this paper, is that I have written so much on the movements of the nomads, and that when quite a boy the very first papers that I published were on the "Westerly Drifting of Nomades," in which these same Seljuk Turks filled rather a conspicuous place. I cannot say what I have to say, which will be very short, without expressing my own personal gratitude for the extraordinary precision and clearness and compactness with which so many facts were condensed together in this paper, which was so desperately interesting to all of us. If I may raise one issue, it is more for the purpose of getting an answer from Prof. Ramsay than for any other purpose. The issue I would raise is this, that the civilization and the culture and the fertility of Asia Minor are all on its borders, and that the interior of Asia

Minor is now what it must always have been, very largely indeed, a country in which it was impossible to have a settled people at all—it must always have been a country of nomads. And you will notice a remarkable fact in the map before you, that the only town in the great stretch of country reaching from Sardes to Trebizond is Iconium. From the very earliest times you have had in the centre of Asia Minor, just as you have had in the centre of Spain, which is another case to add to the one that Sir James Bryce mentioned in Mexico, a great plateau where only nomads could really very largely exist; and consequently you find this curious fact—that every great set of invaders who came to Asia Minor plunged themselves into these central districts, and it was from here they made their raids and their conquests of the surrounding districts. It was so, I believe, with those Aryan nomades, the Cimmerians, who in the seventh century B.C. devastated Magnesia and the other coast towns of Asia Minor. The Galatians, who were in a somewhat nomadic state, also planted themselves, not on the coast, but in this same central plateau, and from this they made their invasions until they became more or less settled. It was the same with the later Turks. We must separate these Seljuk Turks from every other kind of Turk. Every beautiful piece of porcelain that comes from Western Asia, in nearly every case I have seen, comes from a Seljuk mosque or a Seljuk building of some kind. It is the fact that they were extremely amenable to a settled life that distinguishes them so absolutely from all the other Turks that one knows anywhere. The Turcomans themselves, who are their first cousins, and who now inhabit the great plateau, when the Seljuk empire was destroyed in 1260, broke up into ten small communities, and one of them became afterwards the great Ottoman empire. It grew out of one of these little fragments. This particular kind of Turk must be differentiated from all others by the fact that they were capable of forming settled communities, that is why they differed from the nomad Arabs. The Arabs had their great towns at Baghdad Damascus, and at Aleppo they had another; but the great mass were Bedouin, who were quite incapable of forming settlements in towns and of forming a great nucleus from which to fight a civilized power like the Byzantines. Also, no doubt, as Mr. Hogarth mentioned, their whole surroundings, the particular kind of camels they had, and the life they had led, made Asia Minor very difficult for them to settle in. We were only recently talking in the coin room of the British Museum of the fact that on many of the Asia Minor coins the camel is represented, but it is always the two-humped camel. In the time of the Greeks there must have been a large number of these camels, because they are so often represented on the coins. I consider the most interesting problem that has to be solved in Asia Minor is for some one like Prof. Ramsay to give us a work on the mythology of this country. It has been the fashion too long and too much to confuse the gods and goddesses of the various provinces of Asia Minor with the corresponding gods and goddesses of Greece by giving them names, sometimes double names, in which the native god or goddess is lost altogether in the Greek prototype, which we know very well. The fact of the matter is that the whole surroundings of this mythology were absolutely different to anything that we have in the Greek world, and there is nothing so misleading as this practice. There is no one who can do the work so well as Prof. Ramsay, if he would give us a monograph on this subject, and I hope he will be able to say he has something of the kind in contemplation. I am sure we all feel exceedingly grateful to him for his paper, and we hope it will only be a very short time before he gives us another.

Prof. RAMSAY: On the effect produced by the nomad Turkmen and other tribes I have laid special stress, while omitting the terrible Mongol raids, partly

because the nomads have not been properly taken into account by any historian (except the original Byzantine writers), so far as I know; but also because the nomads were a permanent and earlier cause, while the destroying hosts of Tamerlane came and went, and the Roman cities which he annihilated might have revived, had not the nomads already isolated them from one another and paralyzed the circulation which makes the blood of the nation vital.

Mr. Hogarth's remarks about the difference in character between the high plateau north of Taurus and the low hot Cilician lands do not seem to me to conflict with anything I have said; they merely lay due emphasis on one of the causes which united to make Taurus a boundary. But his argument that, because the plateau of Asia Minor has usually been subject to an external empire, having its capital further east or further west, therefore that must always have been the case in the earliest times—that is an argument which I cannot accept; and Mr. Hogarth himself has recently been supplying a disproof of his own reasoning. Crete has been insignificant in history for nearly 3000 years; but now, thanks to Mr. Evans and himself, we have perfect corroboration for the Greek belief and myth that Crete was once a great centre of power and civilization. In the circumstances of the period between 3000 and 1000 B.C. (very different from later conditions), Crete and central Asia Minor stood in very different relations to the countries around; and the myths which speak of great kingdoms on the central plateau are confirmed and proved by the imposing ruins of Pteria, an imperial city, not a mere provincial capital.

Sir H. Howorth most justly praises the art of the Seljuk Turks, as I have often done, but there remains much to say as to causes. On the other hand, he has, I venture to think, exaggerated the barrenness and unproductiveness of the great plains of the central plateau. Those plains are marked as "désert salé" on the maps, such as Kiepert's; but this is quite false. The soil is almost everywhere good, and only needs the distribution of the water supply (which is frequently available) to make it a garden. It was covered with towns and even great cities in ancient times. Between Iconium and Trebizond (not to speak of such great cities as the present Kaisari, the ancient Cæsareia-Mazaka) there were many important cities, Justinianopolis, Pteria, Sebastia, Neocæsareia, and a score or more of others. During last summer we found the site of Savatra, containing the ruins of a considerable city, with its own coinage and its theatre, where now it is physically impossible for more than a few nomads to find food and water.

But Sir Henry also has touched on a remarkably interesting subject, the distribution of animals and the relation of that subject to mythology and religion—a subject which I have very briefly alluded to in my rather desultory paper, but about which there is much to say. As he says, we were a few hours ago talking in the British Museum of the Anatolian camel. Now, contrast what he has stated about ancient times with the fact that at the present day the camel of Asia Minor is the one-humped Arabian, not the two-humped Bactrian camel.* What an amount of history lies in that one contrast! Here I cannot add more, but what is stated about the Anatolian systems of breeding in my 'Impressions of Turkey,' pp. 272-274, is enough to show how much may be expected from proper investigation by a more competent observer in the country. I have often longed for the company of a trained naturalist in Anatolia. In conclusion, I may say that I have long wished that the opportunity might be given me of making a proper study of

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* The Bactrian camel is used in Anatolia only as a sire, and the offspring of Bactrian sire and Arabian dam is always mule.

the mythology and religion of Asia Minor; and that I am very grateful to Sir H. Howorth for the expression of his interest in that wish. I had written something more in this paper on the relation of land and religion, but had to omit it; and I may flatter myself that what I wrote was on the right lines, because it agreed with the spirit of what Mr. Bryce has said to-night.

In the course of my paper I spoke about my successors, junior to myself, but I omitted to mention, as I intended to do, my predecessors, and especially to say that it is to Sir Charles Wilson that my own explorations in Asia Minor are entirely due. It happened that on the day that my wife and I landed in Asia Minor, now almost twenty-two years ago, Sir Charles Wilson, who was at that time organizing the English Protectorate over Asia Minor, had come to spend two days in Smyrna, and I met him on the day I landed. And it was owing to his example, to his teaching, and to the way in which he invited me to accompany him on two journeys and showed me in practice and in theory the ways of travelling and investigation and surveying—it was entirely due to this cause that my own explorations were directed to that part of the country. I felt it to be unfair to speak only of my successors, and to have omitted entirely to refer to the origin of my own work on the subject.

The PRESIDENT: In closing the discussion, I should like for a moment to refer to the early geographers who have worked in Asia Minor. The greatest geographer this country ever produced, Major Rennell, devoted many years to the study of what could then be known of the geography of Asia Minor in order to elucidate the March of the Ten Thousand and other historical points. The earliest of our modern travellers in Asia Minor was Mr. Hamilton, whose accuracy of observation would be testified to, I am sure, by every one who has gone over his ground, and he was a President of this Society.* One of our oldest vice-presidents, and the one who was for the greatest number of years vice-president, was Colonel Leake, whom I think Prof. Ramsay mentioned as the greatest of modern topographers. Since his time we have endeavoured to help the work of exploration in Asia Minor, and the result has been Prof. Ramsay's great work on the geography of the country, and his paper this evening, which I cannot help feeling is the forerunner of something much more detailed in every branch of the subject, which I am sure we all hope may appear in the course of time. The paper is full of suggestiveness—nearly every paragraph makes you want to know more on that particular point, and therefore I think we may hope that before many years have passed we shall have more complete information from Prof. Ramsay on each point that he has touched upon in the paper. I think it must have struck us all how very much history owes to accurate topography. In Prof. Ramsay's paper he spoke of that secondary Paphlagonian valley, the history of which can only be elucidated by the study of its topography, and still more that glen which he mentioned, and which, as I understood him, is the key to an accurate knowledge of the March of the Ten Thousand. It was always a puzzle in what direction Xenophon marched until that particular glen was discovered, when the whole story became perfectly clear. There are one or two other instances in the paper showing the great importance, as Mr. Bryce has pointed out, that accurate geographical knowledge is to any one who wishes to elucidate or understand history, and especially ancient history. But the subject is full of interest, and I am sure you will all wish to pass a cordial vote of thanks to Prof. Ramsay for his paper this evening.

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* Hamilton is styled "the prince of travellers in Asia Minor" by Prof. Ramsay.

THE CAURA AFFLUENT OF THE ORINOCO.

By E. ANDRÉ.

Part I.—The Caura.

It was in September, 1897, that I paid my first visit to the Caura. On that occasion I had not intended, when I left Trinidad, to be away for more than a couple of months, but I got so interested in the bird-life of the region that I did not return until May, 1898, having spent very nearly eight months on the trip. The furthest point reached then was the island of Cangrejo, just beyond the rapids of Piritu. With the exception of a journey to the mountain of Turagua, which I have described separately, I was all the time in the immediate vicinity of the river itself. During that first visit I collected a considerable number of birds and some orchids. *Cattleya superba* and *Epidendrum Stamfordianum* were the principal plants obtained. Among the men who were with me during those eight months were three Indians from the headwaters of the Caura. One of these men was a new arrival, but the others had been knocking about the Venezuelan settlements for years, and in consequence spoke enough Spanish to make themselves understood. During the frequent conversations I had with these men, I acquired a good deal of information about the country from which they had come. I have referred to this first trip because it led to the expedition undertaken in 1900, the results of which I shall try to embody in the subjoined article.

As far as Temblador the ascent of the Caura does not present any serious difficulties. In fact, during the rainy season flat-bottomed steamers, even of considerable size, can perform the journey without more risk than attends the navigation of the Orinoco. But beyond Temblador it is impossible for large craft to ascend the river; even in dug-outs its navigation is difficult and dangerous. No doubt it is owing to these difficulties and dangers that the country above this settlement has been so little explored. For the last 40 or 50 miles of its course the Caura flows through rolling plains covered with grass, with belts or patches of forest growth along the streams and in the hollows. These open rolling plains are part of the region of the *llanos*, bounded on the north by that spur of the Andes forming the seaboard on the Caribbean sea, and on the west by the eastern cordillera of the Andes themselves. From its source to Aripao, at which place, roughly speaking, we may say that the *llanos* commence, the Caura flows through one vast forest. This part of Venezuela is known as "*La zona de los bosques*," the region of the woods. According to the accounts of the Indians, only two small *llanos* occur in the whole of this forest region of the Caura—one in the vicinity of the Nichare, the other near the sources of the Caranacuna.

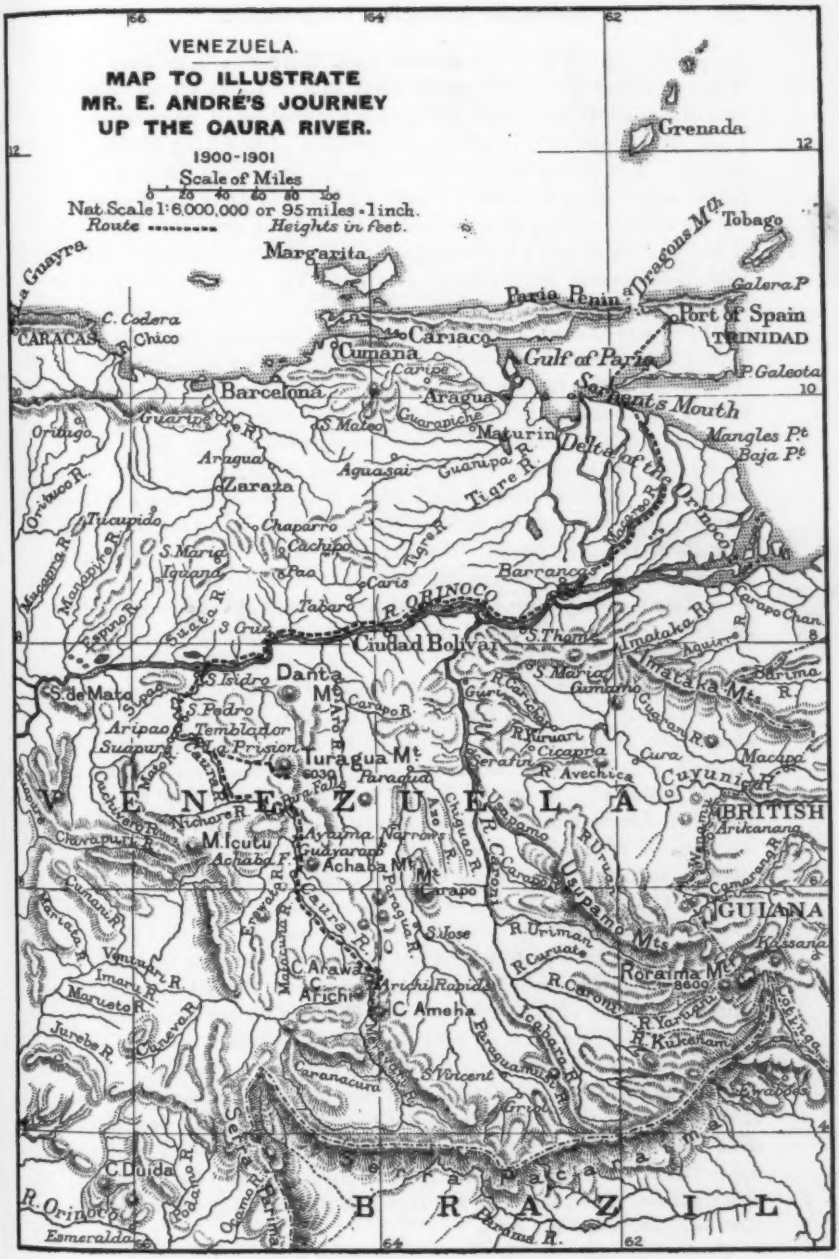
The country on the banks of the Caura from its mouth to the rapids

of Mura is but thinly populated. With the exception of Maripa, scarcely any of the other places can aspire to being called villages; they are merely clearings where rice, sugar-cane, bananas, and a few ground provisions, such as sweet potatoes, manioc, and yams, are grown, with huts scattered here and there for the accommodation of the settlers. At San Isidro and San Pedro there are a few Indians, but they do not appear to belong to any particular tribe. With the exception of these Indians and the small settlement of Waiomgomos, at the rapids of Mura, the inhabitants are Venezuelans, and they are of every shade of colour. These people speak nothing but Spanish. Their principal occupation is collecting tonca beans, the fruit of *Dipterix odorata*. They also do some business in cedar and copaiba oil.

Within recent years there has been a steady decline in the price of tonca beans, which at one time fetched as much as four dollars the pound in the New York market. If I am not mistaken, the value of these beans to-day does not exceed sixty cents. Of course such a decline in prices has seriously affected the people on the Caura, to whom the tonca bean, or *sarrapia* as they call it, means everything. Whereas in former years but little rice was grown, I should say barely enough to meet the requirements of the settlements, to-day there is a considerable surplus, which finds its way to Ciudad-Bolivar. The increase in the cultivation of this grain is the outcome of the decline in value of the product upon which the inhabitants of this part of Venezuela depended for their existence.

In the neighbourhood of the settlements are many hills, some isolated mountains and mountain masses, and a range of considerable extent—the Serrania de Mato, which can be seen from Suapure. All the mountains and hills which I visited during both of my trips are of granitic formation. In fact, all over the district granite predominates. Huge detached masses of this rock are quite common in the middle of the forest. Then there are those open spaces called *lajas* by the natives, and which are nothing else but excrescences of what I cannot help believing to be one extensive substratum of plutonic rock. The same remarks apply to the islands which encumber the Caura, and are the cause of its navigation being so difficult.

Between the mouth of the Caura and the falls of Para the land rises gradually, but the difference in altitude, although of small account, is sufficient to cause the current of the river to be rapid. Mura and Piritu are the places where this incline in the bed of the stream makes itself most felt. The falls of Para constitute a formidable barrier to the navigation of the Caura. Just above the falls the river divides to form an island of between 7 and 9 miles in length. By a succession of cataracts, the two streams rush through gorges on each side of the island to meet at its foot. The right-hand stream is of much greater volume than that on the left, which, after a severe drought, dries almost


VENEZUELA.
MAP TO ILLUSTRATE
MR. E. ANDRÉ'S JOURNEY
UP THE CAURA RIVER.
1900-1901
Scale of Miles
0 20 40 60 80 100
Nat. Scale 1:6,000,000 or 95 miles = 1 inch.
Route .....
Heights in feet.
66
64
62
12
10
8
6
4
Grenada
Tobago
Margarita
Dragons Mth
Galera P
Port of Spain
TRINIDAD
Gulf of Paria
Serpent's Mouth
P. Galeota
Mangles Pt
Baja Pt
Paria Penin.
La Guayra
C. Codera
Chico
CARACAS
Cumana
Cariaco
Barcelona
Aragua
Caripe
Guarapiche
S. Mateo
Maturin
Delta of the Orinoco
Ortigo
Guarapiche R.
Aragua
Aguasai
Guanipa R.
Tigre R.
Zaraza
Orinoco R.
Tricapido
Chaparro
Cachipo
S. Maria
Iguana
Paa
Caris
Tigre R.
Barranca
Macareo R.
Manapire R.
Monagas R.
Pao R.
Cuata R.
3 Cruz
Tabar
R. ORINOCO
S. Thome
Imataka R.
Aguire R.
Caroni R.
Ciudad Bolivar
S. de Mata
S. Isidro
Dantas Mt.
Caroni R.
S. Maria
Cumana
Cuchara R.
Imataka Mts.
Barima R.
Suapure R.
S. Pedro
Aripao
Temblador
Suapure
La Prision
Turagua Mt.
Paraqua
Falls
Guri R.
R. Caricay
R. Kuruari
Cicapra
Serafin R.
Avechica
Cura
Macupa
Cuyuni R.
VENEZUELA
BRITISH
GUIANA
Arikanana R.
Cachimbero R.
Nichare R.
Chaviripa R.
M. Icutu
Ayama
Narrows
Achaba F.
Achaba Mt.
Mt. Carapo
Aso R.
Chuguo R.
R. Caroni
Usupamo
R. Uruan
Usupamo Mts.
Camaripa R.
Cumana R.
Mariata R.
Caura R.
Paraqua R.
S. Jose
R. Uriman
R. Curuai
Roraima Mt.
8600
Kassana
C. Arawas
Aruchi
Aruchi Rapids
C. Ameha
R. Caroni
R. Yaruparu
R. Kukenam
Morueto R.
Imari R.
Vuturupi R.
Jurebe R.
Cuchivero R.
Iguapo R.
Paragua R.
Caranacura
S. Vicente
Erebato
Sierra Parima
C. Duida
R. Orinoco
Padamo R.
Esmeralda
BRAZIL
Parima R.

completely up. Where the streams meet there is a large deep pool. When the river is low this pool is calm, and its banks are stretches of beautifully white sand, with backgrounds consisting of huge masses of black rock supporting in places a vegetation of flowering shrubs and orchids. It is then a lovely, peaceful-looking spot, even the roar of the falling water being subdued. I must confess that when I saw the falls for the first time I was disappointed. Although the scene was beautiful, it was not the picture I had conjured up when the Indians had described with bated breath the grandeur of Para. The island which divides the river is densely wooded. It is over this island that the portage of the boats was effected, a work which occupied seventeen days. A track having been cut through the forest, round logs were placed crosswise on the ground. The boats were then hauled over these logs by means of pulleys, one attached to the head of the boat, the other to a tree some 20 or 30 yards in front. Had I not brought the pulleys and a coil of strong rope, we should never have succeeded in getting the boats over the island. The first part of the portage is the worst, for the hill rises abruptly from the pool up to 600 feet; then there is a plateau broken by hollows in three places. We had to build two bridges over deep ravines, which added to the difficulties of the undertaking. At last, after seventeen days spent on the island, we were able to continue our journey. The plateau where the falls begin is about 1000 feet above sea-level; so that the land at this spot rises about 800 feet, that is, taking my barometer-readings to be correct. The bed of the stream, for a considerable distance after leaving the falls, is encumbered with islands and masses of rock. At one spot a ledge of granite over 200 yards in width runs across the river, forming a dam over which the current rushes with violence. It took us a whole day to haul the boats over this obstruction. A couple of days' journey beyond the falls are the narrows of Ayaima, one of the most picturesque spots of this picturesque river. The whole volume of the Caura rushes through a gorge not more than 30 feet wide. Above and below this gorge the river expands into large pools dotted with islands. Beyond Ayaima the Caura flows by a perfect labyrinth of channels through hundreds of islands. The place is called Guayarapo, and is most difficult to navigate, being a succession of dangerous rapids. The next serious obstruction in ascending the river is met with at Achaba, where a series of falls necessitate a portage through the forest, but the portage is a short one. From these rapids we had a good view of the mountain of Achaba. It was the first we saw of those flat-topped masses with precipitous sides which form so extraordinary a feature of the landscape of the upper Caura. Above Achaba the river is broad and deep for a considerable distance. Then there are the rapids of Suraima, beyond which the river is again broad and deep.

From the rapids of Arichi can be seen the mountains of Arawa and

Arichi, while in the distance, veiled in bluish haze, the outline of Améha can be just dimly discerned. It takes three days to paddle from Arichi to Améha. Where the Caura, or rather the Merevari, flows past the mountain its banks are 1500 feet above sea-level. From the river the cliffs look so near that one would scarcely believe that it takes a day and a half of steady walking to reach them. Before getting to the slope leading to the precipice, a belt of low-lying tangled growth has to be traversed. The trees of this growth are stunted, and their branches twisted and unshapely. They are covered with mosses and parasites, and appear to be always dripping with moisture. Besides other plants, I noticed two sorts of begonia, some caladiums, and a sobralia. Mounds or hillocks are scattered over this low-lying strip of land. Although the elevation of these mounds or hillocks above the surrounding country is but slight, the vegetation which clothes them is different. In this stretch of low-lying land, interspersed with hillocks, we obtained, in addition to some other birds which I do not know, a remarkably handsome partridge and a quail. Although we found the bald-headed cotinga (*Gymnocephalus clavus*) to be common enough, we did not secure many specimens. The Indians call this bird *koa*, which sounds very much like the Demerara name "quow." The little adouri (*Dasyprocta acuchi*) is one of the commonest of the smaller mammals.

Where the land begins to rise, and for a distance of, I should say, speaking roughly, 2 miles, the ascent is gradual and regular. Close to the cliffs the incline is so steep that we frequently had to crawl on our bellies. We had met with some enormous masses of rock on our way, but along the base of the precipice we found such masses to be quite plentiful. For three days we wandered about the foot of the cliffs, but we did not make much progress on account of the *débris* we encountered almost everywhere. The general colour of the cliffs is a yellowish-grey. In one place where a huge piece of many thousand tons had been recently detached from the main mass, the colour of the freshly exposed surface was a bright red. Probably this after a time would assume the same yellowish-grey tint which is the prevailing colour of the cliffs. The men had built two huts at some distance from the precipice, and there we slept and did our cooking. On the last night of our stay near the cliffs, we witnessed one of those terrific storms which during the rainy season are of daily occurrence on all these mountains. Up to about one o'clock the night had been oppressively still, so still that there was not even a rustle amongst the leaves. In the fitful sleep which I had had up to then, I had noticed every time I woke how black and quiet it was. The first intimation we got of the approaching storm was a blinding flash of lightning, accompanied by a clap of thunder so loud that we all sprang out of our hammocks. Almost simultaneously with the thunder came strong gusts of wind, causing our huts to sway from side to side so that I expected to see

them blown down at any moment. Flash of lightning followed flash with scarcely an interval between the flashes. All the time there was an almost continuous roar of deafening thunder, which made the ground tremble beneath us. The rain came down in torrents, and the wind had increased to such a gale that heavy branches were being snapped off in every direction, while now and again some old monarch of the forest, unable to withstand the force of the wind, would come down with a terrific crash. The men assembled in the largest and strongest of the huts. All we could do was to remain in one place and hope that no tree would fall upon us. Old Maite, the Indian, was in a terrible fright. Whenever there was a lull in the storm which allowed his voice to be heard, he would tell us stories of the wicked spirits who inhabit these mountains, and how they got angry whenever men invaded their precincts. It would have been folly to have tried to explain to this hardened believer in gnomes and demons the phenomena of a thunderstorm. How long this battle of the elements lasted it would be hard to say. Probably we exaggerated its duration. The storm ceased almost as suddenly as it had commenced. A few gusts weaker than the others, and the work of destruction was being carried on lower down, the thunder dying away in the distance.

When I first explored the mountain I was struck by the size and number of the branches strewn about the ground, but after having witnessed one of these storms I found no difficulty in accounting for this state of things. The rainfall at Améha and in its immediate neighbourhood is, I should say, very much greater than that of the surrounding country, and that is saying a great deal considering that in these equatorial forests the rainfall is heavy. In fact, the vigorous vegetation existing over a great part of tropical America depends for its luxuriance on the torrents of rain which for nearly three-fourths of the year are of daily occurrence.

The time to see Améha in its glory is immediately after a heavy shower. The waterfalls, which dwindle away to mere threads after several days of dry weather, are then in all their grandeur. Even at our camp on the banks of the Merevari it was possible, on occasions, to hear the roar of the falling water. The Indians never tire of telling stories about the mountain. Quite a number of legends have been handed down respecting it. On its summit is a large lake, so deep that it cannot be fathomed, and its waters are the abode of strange gigantic creatures not found elsewhere. Gnomes and demons dwell amongst its inaccessible crags, and they it is who cause the lightning, the thunder, and the wind. I very much regret that during my stay at Améha I did not succeed in getting to its summit, but I hope to be able to do so some day. What rich fields for the naturalist and botanist must the tops of these inaccessible mountains be, isolated during countless ages from the country beneath!

We left Amêha on April 24. On the 27th the large boat which carried my plants, the seeds, insects, herbarium specimens, samples of rock, and birds collected during the journey, was wrecked in the rapids of Arichi. It would not be within the scope of this article to give a detailed account of the sufferings we endured between the day when we lost our boat and our arrival at La Prision on May 23, twenty-six days after. It is sufficient to mention that out of fourteen men only eight reached the settlement alive.

With the exception of the few Indians living at the rapids of Mura, a distance of about 3 miles above the settlement at La Prision, no human habitation is met with either on the Caura or the Merevari until the large Waiomgomo house or compound on the slopes of the range forming the boundary with Brazil, near where the Emecuni rises, is reached. For a distance of over 200 miles as the crow flies, and for double that distance following the windings of the river, there is nothing but a wilderness of uninhabited forest. It was not so when the Spanish missionaries visited the country and established a station at the mouth of the Erewato, above the falls of Para, which they called San Luis de Erewato. Many tribes then dwelt on the banks of the Caura, but within the short space of time which has elapsed since these tribes came in contact with white men, they have been completely blotted out. Such has been the fate of the American Indian all over the Western Hemisphere. He cannot live alongside the European or his descendants.

Of the numerous tribes which dwelt on the Caura and in its neighbourhood, only the Waiomgomos have survived, and they also, although so far removed from civilization, have, according to Isidor's accounts, decreased to an appalling extent within a comparatively short period. To-day the compound on the Merevari range does not contain more than fifty or sixty people, of whom about two-thirds are women. They are polygamous, some of the men having two or even three wives. In the few books I have read dealing with the Indians of Guiana, these people are referred to as Maionkongs. They call themselves, however, Waiomgomos. I was particularly careful to satisfy myself on this point, and I even mentioned the word Maionkong to Isidor as being the name by which his tribe was known abroad. He told me that the Indians through whom his tribe received such articles as knives and fish-hooks from British Guiana, spoke dialects so different to that of the Waiomgomos, that they would probably find it almost impossible to pronounce certain words correctly. To this must be added the difficulty attending the rendering of names from a language entirely different in structure to any European one, without taking into account the carelessness with which names and words are very often jotted down by travellers.

The Waiomgomos at Mura, who come in frequent contact with

Venezuelans, have added something in the way of dress to what they were accustomed to at the headwaters of the Merevari. The women are very fond of bright-coloured cloth, a piece of which they wear tied over one shoulder so that it hangs down and covers the breasts. Beads are the favourite ornaments of both men and women. The men, while working, wear nothing but a strip of blue cloth passed between the legs and fastened to a string tied round the waist. To receive us, they always dressed, if the wrapping of a piece of cloth around the body can be called dressing. A long strip of the same cloth is sometimes passed over the shoulders and under the arms in many folds. Both men and women paint their faces and bodies a brick-red, using annatto, and the effect produced when they are well painted is pleasing. The Indians of the distant village on the Merevari do not use annatto, but a pigment obtained from a creeper unknown on the lower Caura. The colour of this pigment is a bright scarlet, much brighter than that of the annatto.

With the exception of rice, which the Indians at Mura have only recently begun to cultivate, and which has not reached the villages on the Merevari, the articles grown, the methods followed in agriculture, the preparation of cassava and *yaraqué*, are similar in both places. The manufacture of cassava cakes from the poisonous manioc (*Manihot utilissima*) has been so frequently and fully described that a detailed account of the process would be a waste of time. *Yaraqué* is the fermented drink made from the cassava, and it is known under different names all over Guiana. Ordinarily, *yaraqué* is prepared only in sufficient quantities every three or four days to meet the requirements of the household. Banana leaves are placed on the ground in a corner of the hut, and upon these leaves the cassava, thoroughly damped with water, is spread in layers. On each layer a powder of a sage-green colour is sprinkled. This powder is called *yaraquéro*, and is prepared from the leaves of a plant of the same name (*Trema micrantha*). The preparation of this powder is simple. The leaves, having been dried on the large slab used for baking cassava, an operation which does not take long, are then reduced to powder by being rubbed between the hands. This powder is kept in well-stopped gourds, as there is a minute red ant which is very fond of it, and will find it out wherever it may be hidden. The mass of damped cassava and *yaraquéro* is then covered over with banana leaves and allowed to ferment. At the end of two or three days the mass becomes slightly sour. In this state it is either eaten or drunk mixed with water and cane-juice. If allowed to ferment for more than three days, it becomes intoxicating. Large quantities of *yaraqué* are consumed during the dances which form part of almost every celebration among the Indians. On these occasions the stuff is prepared on a big scale, generally in dug-outs.

The agriculture on the clearings is carried on in the most primitive

manner. One day I saw one of the Indians planting maize. With a pole sharpened at one end, he walked along, digging little holes at intervals. He was followed by a boy, who dropped a few grains of maize in each hole, and then threw some earth over the grains with his foot. I was often struck by the dexterity with which these Indians use their feet for picking up any small article they may have dropped. Besides food-stuffs, cotton is always grown on the clearings; it is used principally in the manufacture of hammocks. For animal-food, the Indians depend entirely on hunting and fishing. They are very expert fishermen with the bow and arrow, but they also fish with spears and hook and line. All game and fish which have to be kept from one day to the other are smoked. Like most South American Indians, the Waiomgomos are impatient of any sort of control. They are, moreover, an exceedingly unreliable people. In structure they are short, but well set and muscular. They can eat enormous quantities of food when food happens to be plentiful. In fact, they get up frequently during the night to eat. This habit of gorging is acquired during early youth, when the children are allowed to eat as much as they can—that is, when food is abundant.

In the immediate vicinity of the settlements the larger game animals are scarce, although now and again a tapir is killed. Bands of peccaries sometimes visit the provision gardens, when several are killed, but this is not a common occurrence. The howling monkey (*Mycetes seniculus*) can be heard almost every day in the morning quite close to the clearings. It is only after passing Cangrejo, however, that game may be said to be plentiful. Between the falls of Para and the mountain of Améha six tapirs were killed, and we could have secured many more had we not been in a hurry to reach the mountain. Curiously enough, on our return we saw only one tapir. It is true that the river had risen considerably, and as the hollows in the forest had water, the animals were not obliged to visit the river. The tapir appears to be more abundant in the vicinity of rapids than elsewhere. And this would appear to bear out the statement of the Indians that these animals feed largely on an aquatic plant which grows in abundance in places where the current is strongest. The plant is *Neolacis corymbosa*. At first sight this neolacis, so soft and delicate, appears out of place, growing as it does exposed to the full force of rushing water in places where a man can barely stand if he attempt to wade up to his knees. But if the plant be closely examined, it will be seen that, while the stems and leaves are soft and pliable and yield to the force of the current, the roots are hard and wiry, and cling with such tenacity to the surface of the rocks that it is almost impossible to remove the entire plant. Any attempt to do so resulted, as I found, in the breaking of the stem at the point where it springs from the roots. This neolacis exists only under water. With the falling of the river the exposed plants die,

leaving a network of white thread-like roots with sharp points, where the stems have dried up. If tapirs feed largely on these aquatic plants, as the Indians affirm, their elongated snouts would be of great use in tearing off the succulent leaves and stems from the uneven surface of the rocks to which the plants attach themselves. Even commoner than the tapir on the banks and islands of the Caura is the capybara (*Hydrochærus capybara*). We frequently met with whole families of this huge rodent. They are expert swimmers and good divers, but they cannot remain long under water. Of the larger carnivora during the whole trip, I saw only two pumas and heard one jaguar.

The whole of this region over which I travelled is particularly rich in bird-life. It is unfortunate that the collection made above the falls of Para and at Améha should have been lost, as I have no doubt that it would have proved an exceedingly interesting one. About nine hundred birds collected in the neighbourhood of La Prision and on the Nichare were sent to the Tring Museum, and I understand from Dr. Hartert that they will be incorporated in a work now being published on the birds of the Orinoco, a publication which is sure to be of interest to ornithologists.

The large alligator is not found beyond the falls. It is replaced by a much smaller species, called *bava* by the natives. The electric eel (*Gymnotus electricus*) and many fishes abundant in the lower reaches of the Caura do not occur in the river above the falls. On the other hand, the *Aymara*, a large fish with sharp powerful teeth, common above Para, has never been caught, at least so the Indians say, in the river below.

What are the possibilities of the Caura? Its banks are clothed with many valuable tropical woods and forest products. On the Nichare there is an abundance of a *Micrandra*, of which Dr. Britton wrote in September, 1898—

"Referring to the sample of rubber gum, and the accompanying specimens of the foliage and flowers of the tree which you described to me as producing them, I would say that I am informed by Dr. John K. Small, curator of the Herbarium of Columbia University, that the tree is a species of the genus Micranda, natural family Euphorbiaceæ, closely related to the same genus Hevea. It appears from Dr. Small's studies that the species comes nearest to *Micrandra siphonioids* of Brazil, but that it is probably different, and most likely is an undescribed species. All the Micrandras hitherto known are Brazilian."

In a report subsequently made on the rubber obtained from this tree, samples of which had been sent to New York, it was described as being equal to medium Para.

Leaving out of consideration the difficulties attending the actual navigation of the Caura, there remains a reason why any attempts to ork the rubber tracts on the Nichare are almost certain to meet with

failure, and that is the utter absence of any population whatever above the rapids of Mura. Should settlements be established as far as the falls of Para, it might be possible to work the undoubtedly rich rubber region which exists on the Nichare with success. Until then even voyages of exploration can be undertaken only at considerable risk.

Part II.—Ascent of Turagua.

One of the most striking features of the landscape of this part of the Caura is the mountain of Turagua. Immediately after leaving the Mato one can get a good view of it, and from the *lajas* in the forest and the islands in the rapids its triple crest presents an imposing appearance. It is one of those mountains which one feels a longing to climb. In the March of 1898, I got the three Indians who were with me at La Prision to cut a track to its base, a work which took them nine days to perform. I think the trip worth while describing here, although it formed no part of this expedition.

March 11, 1898.—The Indians came early. It was a raw, drizzly morning, with heavy banks of clouds piled up towards the east and appearing to almost touch the tops of the trees. Such threatening weather denoted abundance of rain, and I knew that we would be soaked through and through before getting very far. Nevertheless I decided to start at once, for the trip had been forcibly put off so often, that it seemed at one time as if some strange fatality stood in the way of our long-contemplated journey to the mountain. No time was lost in preparing the packs. Oval frames about 3 feet in length, made of thick pieces of pliable creeper with strips of bark woven between, had been prepared. The articles to form the pack were placed between two of these frames, which were then securely tied together. Each pack weighed from fifty to sixty pounds, and was carried by a broad band of bark stretched across the forehead, the pack resting on the shoulders and back. Several kinds of bark are used in Venezuela for this and various purposes. From the *majagua* (*Hibiscus tiliaceus*), which is common in many parts of the country, good cordage is made. In the northern mountain range, where all the traffic is performed by pack-animals, the trappings of the donkeys and mules are usually plaited from the bark of this hibiscus. The word *majagua* is used indiscriminately in speaking of the tree or the bark obtained from it. On the Caura two sorts of bark are employed, one is called *coco de mono* (*Chytroma rosea*), the other *cabeza negra* (*Apeiba Tibourbou*). These barks, being pliable and strong, are put to many uses by the Indians and Venezuelans.

The method of carrying loads by a broad band across the head is common to most of the American tribes. In certain parts even men and women are carried across the mountains in chairs in this manner

Throwing the body slightly forward, the carriers proceed at a jog trot, and thus cover long distances with a considerable weight.

When we filed out of the settlement our party consisted of the three Indians, Isidor, Maite, and Silvestre, Raoul Turban (a taxidermist), and my boy, Guy. The moment an Indian comes in contact with Venezuelans he adopts some Spanish name. Maite is a corruption of Mateo, and not an Indian name, as one might suppose on first hearing it. Sylvestre, who had come from one of the Waiomgomo villages on the Parima mountains only a month or so before my arrival, had been named immediately by the others. I never could induce Isidor or any of the others to tell me their Indian names. All the Indians of Guiana appear to have the same objection to divulging to strangers the names by which they are known to their immediate relations. It was about nine when we passed the last house at the edge of the clearing and entered the forest, and we agreed not to stop before reaching a place called Esperanza, where the tracks of the *sarrapieros* end, and the trail opened by our Indians began. By the time we got to the *Laja de los Perros* * the rain had increased to a steady downpour. Near to this *laja* a huge slab of rock resting on two upright masses forms a natural shelter. Old Wachee, one of the La Prision *sarrapieros*, and his wife had taken possession of this rocky protection from the weather. They were collecting tonca beans, for the crop was then at its height, and most of the people from the settlement were staying in the forest. We stopped at this natural *rancho* and had a chat with the old man and his wife. They were a dilapidated pair. In the days of his youth the man, who, I was told, had been of a turbulent disposition, had had frequent misunderstandings with his neighbours, especially on feast days when the rum-bottle had been circulated more freely than wisely. In one of his encounters he had suffered considerable damage, not the least of which had been the loss of an eye. The woman was a victim to that curse of the Caura, ulcers on the legs. One of these ulcers had eaten deep down into the very bones of her right ankle, and had so crippled her that she was unable to walk. In spite of her affliction, she followed her one-eyed husband for many long miles into the woods, slowly dragging herself on one leg. The sight of this couple, stricken with age and disease, forced to wander about the forest so as to obtain a living, was painful in the extreme. After leaving this scene of misery we proceeded in the direction of the *Laja Grande*.† Many *ranchos* had been built in the vicinity of this *laja*, for its size and the flatness of its surface offered great convenience for the preparation of the beans. We could hear the *sarrapieros* shouting to each other as we followed the narrow path through the forest. We passed three of their huts, but did not stop. The trail lay almost

* "The Rock of the Dogs." † "The Great Rock."

due east, and except where a curve had been made to avoid some obstruction, such as a fallen tree, it was straight enough. We trudged wearily along, keeping our eyes down so as to avoid being tripped up by the network of roots and creepers with which the ground was covered. Several streams, some with mud, others with sandy beds, had to be crossed. At first I took my boots off whenever we came to one of these streams, but I soon got tired of this repetition of taking off and putting on my socks and boots every ten minutes, and I resolved to leave them on until we should reach our camping-place. It was all right when the bed of the stream happened to be of mud or earth, but where it was sand, and my boots got filled with particles, I still had to take them off and wash the grit out, or I should have been unable to continue walking. At about one o'clock we halted on the banks of a broad clear stream and had something to eat. The Indians had brought ripe bananas, fresh cassava bread, and boiled turtle-eggs. Off these we made a hasty meal, and then continued our journey. We had got beyond the district where the *sarrapieros* conduct their operations. Within the memory of the people at La Prision no one had ever gone further than the *sarrapial* of Esperanza, and there were no tracks beyond the spot except the newly opened trail made by our Indians. The masterly manner in which the cutting of this trail had been performed was really astonishing. In the thickness of the forest, where it was impossible to see anything 50 yards ahead, these men, without a compass or any other instruments, had succeeded in opening a road to the foot of the mountain, of which even a trained surveyor might have been proud. No deviation from an almost straight line marred the accuracy of their work. It was evident, from the quantity of game we came across, that we had got beyond the haunts of the people on the Caura. Although we were far from being a silent lot, and the men, in getting through the narrow path with their packs, made a good deal of noise, yet we surprised a number of the larger game birds which are so difficult of approach near the settlements. These birds, so wild in the vicinity of La Prision, never having been disturbed in this locality, are quite stupid. I could have shot several curassows had we not been in a hurry to get to a good camping-place before nightfall.

Two varieties of carassows are common in these forests. Both varieties are called without distinction *Pauji;* but when the natives wish to draw attention to the different kinds, they speak of them as *Culo blanco* (*Crax alector*), and *Culo colorado* (*Mitua mitu*), on account of the difference in the colours of the feathers of the belly in each species. These two curassows appear to have similar habits. Both utter the same shrill note of alarm on being disturbed, and they make the same deep humming noise when calling to each other. I have never been able to notice any difference in the humming of the two kinds, although

the native hunters pretend that they can tell one bird from the other by its call note. But as it has happened on more than one occasion, that a hunter, after declaring, upon hearing a bird calling, that he was going to kill a *Culo blanco*, has brought back a *Culo colorado*, I have come to the conclusion that the natives cannot, as they pretend, always distinguish between the call notes of the "white" and "brown" posteriors, as they have, with more reason than delicacy, elected to distinguish the two varieties. During the mating season, in the unfrequented parts of the forest, especially along the banks of the streams, the deep hum of the *Paují* may be heard at almost any time of the day. But it is just before sunrise, and in the early hours of the morning, that the *Paují* appears to be most disposed to hum. It is impossible to describe in writing the peculiar noise which these birds make. The native hunters imitate the *Paují* by saying, "*El muerto esta aqui*" ("The corpse lies here"). It is while uttering in a deep tone this lugubrious chant that the *Paují* usually meets its death, for the hunter can then easily track it to its retreat, when it falls a victim, as the people say, to its own death-song. If the *Paují* gets suspicious it immediately ceases humming, and that is an indication to the hunter that the bird has seen him or scents danger. In such a case the only thing for the sportsman to do is to remain perfectly still. The bird may get reassured after a while, when it again begins to call, and it can be then stealthily approached and killed. If wounded only, the *Paují* usually succeeds in getting away. As these birds pass a part of their lives on the ground, they are fleet of foot, and as they are, moreover, of muscular build and plucky disposition, if not killed outright or very dangerously injured, they make good their escape in the dense undergrowth of the forest. The food of the *Paují* is very varied in its character. It consists principally of the fruits and berries of the forest, of certain kinds of which the birds are passionately fond. Like the domestic fowl, the *Paují* is also much given to scratching among the decayed leaves on the ground in search of worms and insects. On more than one occasion I have seen these birds on the rocky islands in the rapids and on the banks of the rivers, apparently feeding on the small snails which in certain places are fairly abundant. During the mating season the males are prone to be pugnacious, and they engage in combats which sometimes result in the serious injury of one or both combatants. Isidor assured me that he had once come across two male *Paujís* engaged in one of these encounters. So engrossed were they with their fight that they paid no attention to him and he was able to observe them for some time. Eventually he secured both. They were so exhausted and injured that they made no attempt to escape when he put a stop to their duel. The same Indian told me that another but very much rarer *Paují* inhabits the forest on the Caura, but as it is nocturnal in its habits, and retires during the day

to some deep hole which it has burrowed in the ground, it is but rarely seen. No serious attempts appear to have been made to domesticate any of the curassows, although they take very easily to captivity, and become quite tame. I have not heard of any case of their having been induced to breed in a state of domesticity. It is a great pity that persistent and intelligent efforts have not been carried on in this direction, as the addition of these handsome and valuable birds to the other regular denizens of the poultry yard would be most desirable.

It was near sunset when we stopped for the night. While Maite and my boy Guy were preparing dinner, Isidor and Sylvestre constructed a *rancho*. Poles were lashed to four trees in the form of a square at a height of about 8 feet. Upon these poles others were placed as rafters. A thick covering of palm branches formed the roof. Either palm branches or the long broad leaves of the wild banana are used for this purpose. Our *rancho* was completed in less than half an hour, and when our hammocks had been slung between the trees under the thick covering of palm branches, the place looked quite snug with the big log fire burning in front of it. Close to our hut one of the men, while collecting firewood, came across the fresh excrement of a full-grown jaguar. The conversation immediately turned upon tigers, as the jaguar is called all over South America, and their doings. Each man had some story to tell of the cunning and audacity of the tiger, and the speaker usually happened to be the principal figure in the story which he was telling. Isidor was an easy winner in this competition of, I am afraid to have to admit, imaginary tiger stories. As he could speak Spanish fairly well, he not only told of his own adventures, but he interpreted the tales of his two friends, and put the finishing touches to them, so as to render them more impressive. It may appear strange that men of the same race who came from villages fairly near to each other should have been utterly unable to carry on a conversation of even a few sentences. Such, however, was the case with Maite and Sylvestre. So different were the dialects of these men, one of whom had come from the mountainous country at the sources of the Erewato, and the other from the Pacaraima range, that they could not exchange even the simplest ideas. It was amusing to observe their futile attempts to carry on a conversation when Isidor, who spoke both dialects and interpreted for them, happened to be absent.

The fact of the members of a small village consisting of but comparatively few individuals speaking a dialect peculiar to themselves is not uncommon amongst the Indians of Guiana. Probably the difficulties of communication in this country of impenetrable forest may, to a certain extent, be responsible for the existence of so great a number of dialects. The prevalence of long-standing blood-feuds between neighbouring villages may also, by the isolation which they tended to produce, have contributed to these divergences from a common language.

As Isidor and his companions told their stories in the ruddy glow of the wood fire, using in their excitement many forcible gestures, they so impressed my boy, Guy, that he got up and removed his hammock from the outer part of the *rancho* where he had slung it, and he begged me to allow him to sleep between the Indians and myself. He was resolved that he, at least, would not be made a meal of by the jaguar, a token of whose presence in the neighbourhood we had seen on our arrival.

Towards midnight it rained heavily, and we congratulated ourselves that we were under shelter.

March 12.—Isidor and Sylvestre were astir early, and woke me by their movements. They were splitting wood, with which they made a torch, while I watched them lazily from my hammock. Although it was quite dark, many curassows were calling in the forest around us, while now and again a tinamu would utter its long-drawn tremulous note. The Indians, having completed their arrangements, started out together. Isidor carried my twelve-bore, while Sylvestre went in front, holding aloft the torch they had made, which cast a bright glare around. They had not been gone many minutes, when a report, followed by a thud, told me that they had succeeded in killing a curassow. After a short while they fired again. When they returned to camp they brought two *Paujis*. They could have shot more, they said, but why waste powder and shot when we had enough game for breakfast and dinner? Indians are, as a rule, poor shots with a gun, yet they rarely miss. I have never seen Isidor or any of the others attempt to fire at a bird on the wing. Why should one fire at birds flying, with a chance of missing, when they can be stalked and potted with certainty at short distances? Powder and shot are commodities too valuable to be wasted in practising difficult shots. But if the Indian be but a poor marksman with a shot-gun, he more than makes up for his lack of skill by his ability as a tracker and hunter. No Indian thinks of wasting a shot until he gets to within but a few yards of his victim.

We made a hasty meal off biscuits and tea, and continued our tramp towards Turagua. The leaves of the undergrowth were dripping with water from the previous night's shower, and we were soon wet to the skin. Almost immediately after leaving our camping-place we got to a part of the forest which the Indians told me had taken them nearly two days to cut through, although I do not suppose that this belt of matted vegetation could have been more than a couple of miles wide. Of the extent of its length we were ignorant. These belts or tracts of tangled creepers and bush are called *bejucales*. They are the dread of all those wanderers in the woods who make a living either by hunting or collecting forest products. Woe to the wretch who gets lost in one of these mazes of interminable creepers—creepers from the size of

one's leg to the thinness of thread—running along the ground, climbing up over the tops of the tallest trees to return again, striking their roots into the damp spongy soil, and with renewed vigour branch away in every direction, a regular spider's web for the poor devil lost in its interminable toils. The *bejucales* are the favourite haunts of tortoises and armadillos. Peccaries, also, are fond of visiting these cool damp resorts where the ground is spongy and soft, and they can dig as much as they please in search of the roots which constitute so large a part of their diet. Many of the larger game-birds are also in the habit of frequenting the *bejucales*. By scratching in the thick bed of rotten leaves covering the ground they obtain the worms and insects which form part of their food, while the trees with their dense overgrowth of creepers afford them good hiding-places. Some of these creepers are fruit-bearing. Of a kind of fruit about the size of a coffee-berry, and yellow in colour, which hangs in clusters from a species of *bejuco*, both *Paujís* and *Pavas* are particularly fond. *Pava* is the native name of one of the penelopes, and it is as common as the *Paují* in this region. But of all the larger birds none affects these densely wooded parts of the forest more than the *Grulla*, one of the *Psophiidæ*. There are few birds more striking in appearance than this trumpeter. It is generally met with in flocks, which at times consist of quite a large number of individuals. If a flock be disturbed while the birds are feeding close together on the ground, as is their habit, they usually make off in a body and go a considerable distance before again alighting; but if they be scattered, each individual, on being alarmed, flies up to some branch of a tree near by, where it utters its call note almost incessantly, so as not to be separated from the other members of the flock to which it belongs. A wild rush into the midst of the flock, if it be a large one, is the best way to scare and divide the birds, when they can be killed singly. In this manner it is possible to secure a good many of the birds before they unite and get away. The flesh of the *Grulla* is very tough, almost as tough as that of an old parrot; but this did not prevent the Indians from eating these birds whenever I killed any. The tinamus, of which there appears to be two or three varieties in this part of South America, are also in the habit of frequenting the *bejucales*. Although these birds are far from being rare, we obtained but few specimens. Living entirely on the ground, and at the least suspicion of danger hiding in the dense undergrowth, it is easy to understand why this bird is rarely seen. If surprised at close quarters, the tinamu rises with a loud whirr, uttering a few quick notes of alarm. At times these birds rise from almost under one's feet, and they make so much noise that one cannot help being startled. A glimpse of a large dark bird as it disappears in the dense foliage is all that the hunter gets, and before he has had time to recover from his surprise, the tinamu has vanished for ever. Although there is considerable difference in

the size and markings of the members of this family, there is a great deal of similarity in their habits. Early in the morning and late in the afternoon the long-drawn plaintive notes of the tinamus can be heard. Towards sunset, on a gloomy rainy day, these birds appear to utter their call more frequently than at any other time. The flesh of all the tinamus is tender and delicate. In this respect no other South American birds can compare with them.

During our march I almost trod on a very large coral snake. The Indians begged me not to kill it. I was surprised at this, because these same men did not appear to have any scruples about destroying other snakes. Tortoises are abundant all over this region. The Indians captured several, which they tied with creepers to the branches of small trees by the side of the track they had cut, to be taken on their return. At La Prision these tortoises are kept in enclosures, and eaten on special occasions. During times of continued drought, numbers of these reptiles are caught by the men and boys who wander along the banks of the streams and pools where there is water. *Morocoy*, as the tortoise is called in Venezuela and Trinidad, is a favourite dish when well prepared. These reptiles can remain a considerable length of time without food. The liver of the tortoise is large compared with its body, and it shrinks in proportion to the length of time during which its owner has been deprived of nourishment; and this has given rise to the belief among the people that the animal eats its liver when it is unable to obtain any other food.

During this day's march we were followed by large gnats, which gave us a good deal of trouble. So persistent were they in their efforts to bite us, that there appeared to be no other means of getting rid of them, except by allowing them to alight, when they could be killed by a sharp slap. They would keep buzzing around our heads until they could settle on some bare spot, when they would nip off a bit of skin and clear out with their booty, to return a few moments afterwards with appetites whetted by the taste of so dainty a morsel. The Indians, who were clothed after the fashion of Adam before he got into trouble, suffered most from their attentions. Embarrassed with their packs, they found it difficult to keep off their tormentors, for they had more than their hands and faces to look after. On this occasion my naked companions must have been convinced that there was some advantage in being clothed. Considering that these Indians undertake journeys, often lasting for months, through dense thorny bush where wasps and ants are plentiful, it is marvellous to note how smooth and free from marks their skins are as a rule. How they can get through certain parts of the forest where the ground is actually littered with thorns has puzzled me. A man accustomed to boots who would dare to attempt such a feat would be lame before he had gone many yards. These Indians all walk with the toes slightly turned in,

and they plant one foot before the other in a straight line. In cutting a track through the forest, much labour is saved if it be made narrow. But the narrower the path the more careful one has to be of the stumps and small trees on its sides. Hence the adoption by the Indians of a system of walking suited to the conditions under which they have to travel.

We ate cassava and turtle-eggs at midday, as we had done the day before. Isidor advised me to drink my fill at the stream where we then were, for we would not, he said, meet with water again until late in the afternoon. He and his companions then set the example by filling themselves up with water as only savages can do. It was necessary that we should hurry on if we meant to reach before nightfall the *rancho* built by the Indians when they cut the track. Isidor took the lead, with Sylvestre following, and they made the pace. As we proceeded the ground became uneven. The Indians told us that we were nearing the first hill, and that we would have to cross three of these hills before reaching the base of Turagua. The aspect of the country when we reached the foot of the hill was quite different to that which we had left behind us. In place of the luxuriant growth of the forest, we were going through a vegetation similar to that of the *lajas*. These *lajas* and the rocky islands of the rapids appear to be excrescences of one immense substratum of granite of which they are the highest points. Where the rock is of smooth or rounded surface no vegetation exists, but wherever there are hollows in which a bit of mould has collected there is sure to be some sort of growth, and in proportion to the depth of this layer of vegetable matter is the luxuriance of the growth which covers it. The flora of these open masses of plutonic rock is so different to that of the surrounding country, that the traveller might well believe himself to be in another region thousands of miles away from the gloom of the forest with its huge trees through which he had passed but a few minutes before. Several kinds of orchids are met with in such places. Some grow on the rocks alone, while others occur only on the moss-covered branches of the stunted trees, all knotted and gnarled peculiar to this vegetation. *Cattleya superba* and *Epidendrum Stamfordianum*, both of which are abundant in these places, attach themselves to trees and rocks. In the case of the former orchid, however, only a small number of plants are seen on the rocks, by far the greater proportion being found on the branches or trunks of trees. It is the opposite with *Epidendrum Stamfordanium*, which grows in such luxuriant profusion all over the rocks in certain parts of the *lajas* that thousands of plants might be collected in the course of a single day. A very fine *Oncidium* and a large *Catasetum* also form part of this flora, but while the *Catasetum* is fairly abundant, the *Oncidium* is rather rare. *Epidendrum elongatum* is another orchid which grows in large masses on the *lajas*, some of the masses being several square yards in extent. As

this *Epidendrum* is very free in blooming, and its flowers vary in shade from light pink to the darkest scarlet, the effect produced by the brightness of colour against the sombre background of black granite is striking. I seldom saw any orchids in the forest itself, but wherever there happened to be open spots of granite or sandstone formation, orchids and flowering shrubs were plentiful.

In climbing these hills we had to proceed cautiously, as rocks of all sizes and shapes were piled loosely one on top of the other, and in certain cases we found that a slight touch was sufficient to displace masses of considerable weight, which would go rolling down the declivity to the danger of those behind. In the more open parts, patches of a tall coarse grass occurred here and there, and were a source of a good deal of inconvenience to us. The blades of this grass would cling to our faces and hands, and, if not lifted off carefully, cut us painfully when we moved away. Even our clothes suffered from the razor-like edges of this grass.

In the lower part of the valleys between the hills the vegetation again became luxuriant. We found in these hollows quantities of a fruit which in appearance and taste reminded me of the sapodilla (*Sapota achras*), but was somewhat smaller and more regular in size. The tree bearing this fruit is one of the tallest in the forest.

From the top of the second hill I obtained a good view of the cliff forming the highest point of Turagua. At the bottom of this hill we pitched our camp close to a rapid stream of beautifully clear water where the Indians had stayed when they cut the track.

March 13.—The Indians went out before daybreak, as they had done the day before, and they were again successful in bringing back a couple of curassows. Turban and Guy preferred not to attempt the ascent of the mountain, so I sent them out to collect birds and butterflies. The Indians and myself then crossed the last of the three hills which run parallel to the base of the main mass. Between this hill and Turagua there is a dark narrow gorge, at the bottom of which a rivulet trickles, forming pools along its bed. We sat on some rocks near one of these pools and rested a while, for a long stiff climb lay ahead of us. The Indians drank copiously, actually filling themselves up with water, and they advised me to do likewise, as we might not, they said, be able to obtain anything to drink until our return, so they thought it wise to absorb a supply to last for the day. There were a good many butterflies flitting up and down over the pools formed by the rivulet, while quantities of flies kept buzzing around us, settling on our hands and faces, and even getting into our eyes.

The ascent of the slope leading to the peak was at first gradual, but by degrees it became steeper. Low down in the gorge and for some distance after leaving the stream I saw but few rocks, a thick stratum of soil having formed in the bed of the valley, and this

supported a vigorous vegetation similar to that we had passed through before reaching the hills. From the tops of the tallest trees came the call notes of the bell-birds. Judging by the frequency with which the metallic bang was uttered and replied to, this chatterer must be common in this secluded valley. The *Campanero*, "the bellman," as the natives call the bird, is rarely met with in the neighbourhood of cultivated spots. The presence of man appears distasteful to this lover of primeval forests, and if his domain be encroached upon by human beings, he immediately abandons it to retire to some distant recess, where he can enjoy the solitude he loves so well.

The higher we got the more rocks we met with, some of them being of considerable size. I noticed that the masses close to the cliffs were generally larger than those lower down, the blocks decreasing gradually in size in proportion to their distance from the main mass. These smaller rocks lower down in the valley had no doubt been also giants many ages ago when they lay at the foot of the cliffs which then formed the central mass of the mountain covering the spot where we now stood. The rains of ages had reduced their volume. Slowly but surely the rains of the future would continue the work of erosion, until Turagua would have wasted away to an inconspicuous hill like those we had left behind us, while those hills would have disappeared into the surrounding plain.

For a considerable distance we skirted the base of the titanic wall which forms the crest of the mountain, without being able to find any spot by which it would be possible to attempt the ascent to the plateau above. Our progress was slow, for in many places the ground was strewn with the *débris* brought down by the masses of rock in their descent from the cliffs. I sat down and rested while the Indians went ahead to try and find some place by which the peak might be scaled. In about an hour's time they returned. They had seen, they said, a gully which appeared to lead to the top of the mountain, but the ascent by it would be, they thought, difficult and dangerous. Isidor suggested that we should try the other side on the morrow, when we might find some spot offering easier means of access than the gully on this side. I determined, however, to see for myself what chances of success we should have in making the attempt by the gully. I found, on reaching the spot described by the Indians, that they had not exaggerated the difficulties of the ascent by this way. A narrow streak of vegetation, consisting mostly of ferns, marked where a stream had cut a shallow bed in the face of the cliff towering above us. For the first 200 or 300 feet our climb was up a surface almost upright, the deviation out of the perpendicular being so small that it only just allowed us to lie on our faces while holding on to the ferns and roots of the plants which the moist rock supported.

Sylvestre and Maite went first, I was third, and Isidor last. These

Indians are excellent climbers. Even the largest forest trees did not appear to offer difficulties which they could not overcome. If the trunk of the tree they wanted to climb was of such dimensions that they could not embrace it, they would choose some other tree near by, and, passing from branch to branch like monkeys, they soon got to the spot they had decided to reach.

As we proceeded we found the ascent less arduous. After the first 100 yards the gully widened out, nor was it so precipitous as lower down. Although the incline was still steep, we were able to stand up. Many stunted trees like those of the *lajas* grew from between the crevices in the rocks, but everything was greener. The rocks, trunks and branches of the trees were covered with beautiful mosses and ferns nourished by the mist which crept daily up the side of the mountain and shrouded its summit. A stately *Sobralia* grew in clumps in great profusion, while in the glades we met with the same razor-grass which had caused us so much inconvenience when we crossed the three hills. The highest point of Turagua is about 6000 feet above sea-level, and consists of one huge block of granite nearly flat on top. Stunted moss-covered trees overgrown with a scandent shrub formed the vegetation of the plateau, which also supported a dense growth of bromelias. The Indians pronounced the scandent shrub to be the water-vine (*Doliocarpus*), and as we were exceedingly thirsty they cut pieces of from 3 to 4 feet in length, which produced a small quantity of clear water. It took quite a number of these pieces to quench our thirst.

To get through the field of bromelias overgrowing the plateau, it was necessary to cut a track through them. Closely resembling the pineapple in its growth, the leaves of this bromelia are armed with sharp spikes, and the plants grow in such dense masses that they form a barrier through which it would be impossible to get without the continuous use of the hunting-knife. Even after the track had been cut we had to exercise a good deal of caution in our movements. Many of the plants bore bunches of yellow fruit, of which the Indians and myself ate a good many. The pulp is white, full of small black seeds, and, although sour, is not disagreeable. I suffered for some time after from a painful itching of the lips, tongue, and palate, and whenever I spat my saliva was streaked with blood. The Indians experienced the same sensations. The fruit of the closely allied *Bromelia pinguin* produces similar effects when eaten.

Our track led us to the south-west, and we reached a point on the edge of the cliff from which there was a magnificent view of the country to the south and west. Standing on a rock quite close to the precipice, I looked over the ocean of trees stretching away beneath us. Towards the west was the Serrania de Mato, where the Piaroas dwell, a long range of dark blue melting away in the distant haze. Through the green of the forest we could see stretches of the Caura glistening in

the glare of the afternoon sun. Isidor pointed along the river to the south in the direction of the country from which he had come many years before. It would take several weeks, he said, to get to that distant village on the Merevari mountains, where his people lived. Between us and that small tribe no human habitation existed, nothing but forest, vast and impenetrable, like that which lay beneath us. We skirted the edge of the precipice for some distance with the intention of descending by some other route if practicable, but a dense mist had been creeping up the sides of the mountain, and we were soon enveloped in it, rendering any further exploration along the cliff impossible. It rained heavily, and we got drenched to the skin. The rain was accompanied by violent gusts of wind, which at this altitude, with our soaked clothes clinging to our bodies, made us feel somewhat chilled. As soon as the fog had cleared up, we retraced our steps through the field of bromelias to the spot where the descent began. We sat on some rocks and ate roasted *pauji* and cassava, which the Indians had brought tied up in wild banana leaves. The descent did not take much time, but as we had left the mountain late it was almost dark when we got within sight of our camp, which we could make out at some distance below us by the bright fire kindled by Turban and Guy. We shouted to give notice of our approach, and, hurrying on, we were soon seated within the circle of ruddy light which the burning logs cast around. Turban said that he had been out the greater part of the day, and had returned a couple of hours before us. Both he and Guy were of opinion that it would be impossible for us to remain where our camp was pitched, if we intended to stay in the neighbourhood of the mountain for a few days. On their return from hunting they had found the whole place alive with flies. Never, they said, had they seen so many flies together. The blankets spread out to dry, our clothes and hammocks, a couple of curassows tied to a branch, everything almost which had been left exposed, had been used by these flies for depositing their disgusting larvæ. From the moment of their arrival they had been occupied passing our things over the fire so as to rid them of the filth left by these disagreeable visitors.

Raoul had shot three curassows. We dined off these and roasted ripe bananas, and then retired to our damp hammocks. Although I was very tired I passed a bad night, as the quantity of bush ticks I had collected on my body during our day's tramp kept me awake the greater part of the time.

March 14.—At daybreak we had the usual cup of black coffee, which becomes indispensable after a time. With Maite's assistance I managed to get rid of some of the ticks with which I was covered, and I then had a good long bath so as to allay the irritation caused by the *garrapatas*, as ticks are called by the natives. With sunrise the flies began to arrive, and by eight o'clock they were numerous enough to be

disagreeable. By the time we had finished breakfast half an hour later they were around us in swarms; it was time to think of getting away. The Indians made up their packs as hastily as they could, and we left without regret this paradise of flies. Although my naked companions were much more heavily laden than Turban, Guy, or myself, we found it difficult to keep up with them until we reached the stream which we had passed two days before. There they left us and hurried on ahead, and we did not see them again until we reached our camp late in the afternoon. It never occurred to them, considering that their track was in places difficult to follow, that we might go astray and get lost in the forest. Probably they expected us to possess some of that instinct for following a trail with which they were so highly gifted. On the way we surprised a flock of trumpeters, and shot three. In addition I killed two penelopes. When we were quite near to our camp it rained heavily, and although we hurried or as fast as we could, we were wet to the skin by the time we reached shelter. The Indians had not forgotten the tortoises left on the way; they were now hanging from the rafters of our *rancho*.

March 15.—We breakfasted early. The Indians broke the shells of the tortoises with a heavy log of wood. They then picked the pieces of shell off the still quivering mass of flesh, which they wrapped up in banana leaves. After crossing the stream they hurried on as they had done the day before, and when we got to La Prision in the afternoon, I found that they had gone on to Isidor's house, probably to have a night of it, leaving word that they would return in the morning. We proceeded with caution, for had we strayed from the trail we might have got lost in the depths of this interminable forest. Game birds were plentiful; but I decided on not wasting time in following them up, as it would have been too fatiguing to have to carry a number of heavy birds over the distance we still had before us. Perhaps the Indians had left us to avoid having to add to their burdens. I killed only four trumpeters as specimens.

By one o'clock we reached the *Laja Grande*, and shortly afterwards we passed before a large *rancho* occupied by several people. Two of the men were breaking tonca beans on a slab of rock, while one of the women was mending clothes and another was cooking. They asked us to stay and share their meal. Although we were all very hungry, I thought it best to refuse their invitation; I knew that if we once sat down we should feel more fagged when we should have to resume our tramp. We passed another hut about a mile further on, and reached La Prision late in the day. For a couple of days we were all footsore, and spent most of the time in our hammocks.

SUMMARY OF THE RESULTS OF DR. SVEN HEDIN'S LATEST JOURNEY IN CENTRAL ASIA (1899–1902).

By Dr. SVEN HEDIN.

THE geographical regions which were the principal objects of exploration during my journey in Central Asia in 1899–1902 are indicated on the accompanying map. It will be seen that I endeavoured to avoid travelling over again routes where other explorers had been before me.

1. *The River Tarim from the Environs of Yarkand to its Lower Extremity.*—This river has been mapped on about one hundred sheets, on the scale of 1 : 35,000, large enough to display all the characteristics and changing features of the stream. The alluvial deposits, which have been laid down in the bed of the river since the current dwindled, as well as every accumulation of mud and every sandbank, have all been indicated. So also have every angle and curve of the bed which the stream has now abandoned; and wherever it has been possible to do so, I have noted the *time* at which these desertions took place. I have ascertained that throughout the whole of its course the stream shows a tendency to shift its bed to the right, that is, to the south. It is especially on that side, namely, the right, that the main stream sheds off its numerous arms or secondary channels, and it is a very common occurrence for the river to follow, for longer or shorter distances, first one and then another of these auxiliary arms. The tendency increases in frequency the nearer the river approaches its terminus, and is most extensively developed immediately before the terminus, where, instead of emptying into the ancient lake of Lop-nor, it now goes on past it and forms the lake of Kara-Koshun, farther to the south.

Throughout the journey I was accompanied by native hunters and shepherds; but as soon as each man's local knowledge came to an end he was dismissed and another guide engaged in his place. Every name given to the stream was recorded, every channel mapped, and the diverse characteristics of the country adjacent to the banks, the graves of saints, the towns, the shepherds' camps, the fords that connect the highways on each side of the river, the lagoons and lateral lakes, the boundaries of the sand-deserts, and so forth—all were noted and plotted out on the sheets of the map. In this way I gathered a mass of material for a minutely detailed monograph upon the course of the Tarim, and the conditions which characterize this the greatest river in Central Asia. In fact, the map is so detailed that with its help it would be possible to construct a profile of the river-bed, at all events to form a clear conception of its structural formation. A number of astronomical positions were determined for the purpose of fixing and controlling the longitude and latitude. Every day, or at least every

RUSSIAN EMPIRE
SHAMO DESERT
Bagrash Kul
Gashuun Gobi
Aksu
Shahbaz Tarim
Turfan
Yarkand R.
South Tarim
Tarim Basin
Kum-tagh Desert
Lob Nor
KASHGAR
EASTERN TURKESTAN
CHINESE
Su-chan
Yarkand
TAKLA MAKAN DESERT
Cherchen
Kargalik
Khotan
Niya
Kiria
Andere
Gass Kul
South Lob Nor
Nor Mts.
Tsaidam
Marco Polo Range
Prejevalsky Mts.
AFGHANISTAN
KARAKORUM
Srinagar
Pangong Lakes
TIBET
INDIA
Sutlej
Dangra Yum Co
Tengri Nor
LHASA
Sketch map showing
Dr SVEN HEDIN'S ROUTES
in
CENTRAL ASIA
Scale of Miles
0 50 100 200 300
Nat. scale 1:13,000,000 or 205 miles = 1 inch
Routes 1899 to 1902
" 1894 to 1897

second day, the volume of the stream was measured; it was found to vary very considerably during the course of the journey. This, however, is neither the place nor the time to dwell upon the causes of this changeability in the levels of the river. Indeed, throughout the whole of its course the conditions of the Tarim are more complicated than would be presupposed, and not a year passes without the channel undergoing very considerable changes.

A large number of photographs were taken all through the journey; meteorological observations were recorded three times every day; and the self-registering instruments used for this purpose were employed throughout the whole of the day.

2. *The Desert between the Lower Tarim and the Cherchen-daria.*—This

CAMP IN TIBET.

part of the desert of Gobi, which had never been visited before, was crossed from Karaul to Tatran (north of Cherchen), and proved to possess an entirely different conformation from the desert of Takla-Makan. The sand, which is heaped up in dunes that go to over 300 feet in altitude, is not continuous, but is interrupted by tracts of perfectly level soil entirely destitute of sand. In the southern parts of the desert small patches of tamarisk and *kamish* (reeds) were met with occasionally, and in such localities water can be obtained by digging down to 6 or 7 feet in depth.

3. *The Region between Cherchen and Andereh.*—This consists of a narrow strip of *tograk* (poplar) forest and steppe, lying between two sand-deserts on the way from Cherchen to Keriya. The more southerly

of these deserts is of no great extent. The region itself is watered by certain of the streams which flow out of the Kwen-lun mountains.

4. *The Lower Course of the Cherchen-daria.*—The regions on both sides of this river were explored, and it was ascertained that the Cherchen-daria also shifts and changes its bed.

5. *The Lower Course of the Tarim between Yanghi-kull and Kara-koshun.*—This part of the course of the Tarim is the most intricate and the most difficult to disentangle of any section of the entire system; accordingly I devoted several independent excursions to its exploration. For example, I was at work there in February, 1900, in the end of April, and the beginning of May, 1900, and again in June of the same year, and each time I adopted a new route and travelled along different branches of the river, all of which were mapped. The contours here are so flat that the stream is subject to the greatest changes, and the current is continually seeking out new channels. At my last visit the little settlements, which have grown up on the banks of the river since the Chinese created the Lop region a separate administrative district, were in danger of being deserted by the stream, and the inhabitants were considering the advisability of building dams to retain the water. How far they will be successful in this the future will determine, but probability is against them.

The tendency of the Tarim to form lateral or marginal lakes begins as high up as Yanghi-kull, where I had my headquarters from December, 1899, to May, 1900, as well as an observation station, at which my self-registering instruments were uninterruptedly at work. Between Yanghi-kull and Arghan the right bank of the river is accompanied by a chain of long lakes bordered by sterile sands, with sand-dunes as much as 300 feet or more in height. The lakes are elongated, and stretch from north-north-east to south-south-west, and are in every instance continued by a series of depressions, penetrating into the heart of the thick masses of sand. These depressions, which the natives call *bayir*, consist of a clay soil without a particle of intermingled sand, and except for a few sparse patches of *kamish* and tamarisks close beside the Cherchen-daria, are absolutely barren. The discussion as to the origin and construction of these depressions must be reserved for another occasion. An east-west vertical section cut through the heart of the Cherchen-Desert would reveal a serrated profile something like the subjoined diagram. In other

words, the sand-dunes turn their steep sides towards the west, whereas on the east they mount up more gradually and by a step-like formation to the summit, which is usually 300 to 350 feet above the general level. This arrangement can only be due to one cause—winds from the east.

The greater part of the lakes which thus accompany the right bank of the Tarim were mapped and sounded during the summer of 1900.

It is impossible here to enter into fuller details with regard to the

BOGTSANG-TSANGPO.

labyrinth of lakes, marshes, and collateral river arms which constitute the changeable delta of the Tarim. In fact, it would be labour in vain to attempt to do so without a general map, and a general map can only be constructed when the cartographical material which I have brought home has been digested, a task that will require at least three years for its completion.

The lakes which I mapped on the occasion of my first journey—Avullu-kull, Kara-kull, etc.—still remain of the same dimensions and keep the same positions; but a number of fresh lakes have been formed in the same region. In fact, the lower Tarim seems disposed to change its course entirely.

6. *The Position of Lop-nor.*—This interesting problem is now solved. The ancient historical Lop-nor is situated precisely where Baron von Richthofen considered that it had been discovered; but its basin is of course now dried up. On its northern shore I found ruins of towns, settlements, and temples, as well as a number of manuscripts, letters of local origin, and tablets of tamarisk wood written on with Chinese script, and dating from 264 to 465 A.D. Further, I discovered on the same northern shore of the ancient lake unmistakable indications of a great caravan route. With the view of ascertaining definitively and thoroughly the contours of the region, I made in the spring of 1901 precise levellings throughout the whole of the lake basin, and the result showed conclusively that the former Lop-nor and the present

Kara-Koshun lie practically at the same level, and are only separated from one another by an insignificant swelling of the ground. Kara-Koshun, however, shows a decided tendency to return to its former situation—a large lake which took me four days to travel round having been formed to the north of it. This new lake is fed by several new streams issuing out of Kara-Koshun, and carrying a volume of not less then 1060 cubic feet in the second.

7. *The Mountain Chain of Astyn-tagh from the Meridian of Charklik to Anambar-ula.*—This mountain chain was crossed and explored in several different places during the course of the year 1901, and the result of my investigations shows that the chain is a double one, not, as shown on our maps, single.

8. *The Desert of Gobi, west of Sa-chau.*—This was journeyed across from the south to the north in January, 1901. It consists of the following belts or sections: accumulated drift-sand, clay terraces, carved by the wind, and *kamish* steppe. Then follow the low hill ranges which form the eastward continuation of Kurruk-tagh; there again we discovered traces of ancient caravan roads.

9. *Eastern, Central, and Western Tibet.*—This mountainous region of Central Asia was the particular object of my interest during this my

LANDSCAPE IN WESTERN TIBET.

last journey, in that I had made up my mind to explore as much of it as I possibly could. To this end I made several separate excursions into Tibet. Profiting from the experience learned in my former journey through the same region, I deemed it expedient to travel with a smaller

caravan of perfectly fresh animals, and as small a quantity of baggage as might be, and so planned my expeditions that I was always able to go back to my base or principal camp, where the various members of my caravan, human and animal, were, from time to time, able to rest and recruit themselves. In this way I was always able to start with a fresh caravan, thoroughly rested and vigorous. My first expedition was made in the months of July, August, September, and October, 1900. Starting from Mandarlik, beside Gas-nor, I travelled due south as far as 33° 45′ N. lat., thence west, north-west, north, and north-east, until I came back to my starting-point. A large part of the caravan, including one man, perished under the incredible hardships which are incidental to journeying in these lofty regions, destitute as they are of every species of vegetation. On both the out journey and the return, I had an opportunity to cross over the various mountain chains encountered, and clear up the orographical structure of the Kwen-lun and the complicated mountain system of Northern Tibet. The positions of a large number of salt, as well as freshwater, lakes, were determined, and their waters navigated by boat. At the same time I took a number of interesting soundings, the greatest depth measured being 157½ feet. The topographical results of this excursion were embodied in a map of 150 sheets.

My second expedition started from the same base. Its object was to complete the mapping of Northern Tibet, especially of the mountains to the north of Kum-kull. This lake also was sounded. These Tibetan lakes are dangerous to navigate in a small open sailing-boat; to do so is always attended with a considerable amount of peril.

But my principal and longest journey through Tibet began at Charklik on May 17, 1901. The route I selected went first up the valley of the Charklik-su, then on to Kum-kull, and over the Arka-tagh. After that I struck a line between the route followed by Littledale and that followed by Prince Henri of Orleans and Bonvalot, and penetrated southwards as far as 33° 45′ S. lat. There the caravan encamped, whilst, accompanied by two attendants, and in disguise, I made a perilous journey as far as the vicinity of Tengri-nor. There we were closely examined, and compelled to return to the caravan, though the Dalai-Lama's emissaries treated us with the greatest respect and politeness. A second attempt to penetrate south from the same camping-place was frustrated at Sellisy-tso by a force of five hundred horsemen.

After that I directed my course westwards to Leh, avoiding both Nain Singh's and Littledale's routes. This journey cost me the lives of two men and of almost all my animals. The baggage animals were yaks, which were everywhere placed at my service by command of the Dalai-Lama. The results of this last journey in Tibet are recorded on a map of 370 sheets.

Whilst the survivors of my caravan were resting at Leh during the winter of 1901–2, I took a run down into India, and shall ever retain

a lively recollection of the hospitality and kindness which were shown me by Lord Curzon at Government House. In Bombay, also, I was welcomed as if I had been an old friend by Lord Northcote, and in every city I visited in India the English people vied with one another in their friendly offices towards me. Nor can I withhold the expression of my admiration at the brilliant way in which England has for more than a century administered that vast empire.

In April I broke up from Leh, and, crossing the Karakorum pass, went down to Yarkand; thence, travelling *viâ* Kashgar and the Caspian sea, I returned to Stockholm, where I arrived on June 27, 1902.

The successful issue of this journey, which lasted altogether three years and three days, was in great part owing to the circumstance that

YARKHLEK-SUS PASS.

his Majesty the Emperor of Russia most graciously appointed an escort of four cossacks to attend upon me throughout. Than these I have never had more honest, more capable, or braver men in my service. Whilst I was absent on my excursions I always left my headquarters camp under the charge of one or two of them, and always had my confidence justified by finding everything in perfect order on my return.

My first journey of 1893–97 has been regarded as marking an advance in the knowledge of the geography of Central Asia. The last journey of 1899–1902, from which I have just returned, has yielded results three times as rich as those of the former journey, and in the course of it I have been enabled to lift the veil which for a thousand years had hidden vast stretches of the mountainous and desert regions of the heart of Asia.

My cartographical material extends to no less than 1149 sheets, and if these were arranged end to end in a long row they would stretch over a distance of 1000 feet. This material I hope it will be possible to publish, either with the help of public funds or by private support. It will then constitute a mine of detailed information about certain of the central regions of the great continent which have never before been trodden by any European, and very often by no Asiatic either. This cartographical material is controlled by 114 astronomical determinations of place. For making these I used an alt-azimuth theodolite and three chronometers.

A complete meteorological journal was kept without interruption throughout, in part during my expeditions, in part also, and simultaneously, in my principal fixed camps, where a barograph and a thermograph were in constant operation. The abundant materials thus gathered in are now being worked up by Dr. Nils Ekholm, and will in due time be published, along with the meteorological results of my first journey.

I took also over two thousand photographs, using for this purpose an English camera and English-made plates, and the results leave nothing to be desired.

Anatomical collections of the higher animals were made, including aquatic animals in spirits, and a herbarium was brought together. All these materials will be studied by experts.

The geological profiles of Tibet will be illustrated by some seven hundred rock specimens collected in that region.

I have also brought home a number of archæological treasures from the ruins we discovered in the desert, amongst them several objects of extraordinary interest; and I made, further, a great quantity of sketches, diagrams, and drawings, to illustrate various features appertaining to the provinces of physical geography. In a short *résumé* such as this, it would not be possible even to indicate the great variety of different observations which are embraced under this heading. It must suffice to mention the measurements made in the basin of the Tarim, upon which a vast amount of time was expended, but which supply the essentials for deducing the hydrographic character of that river system.

For the present I have my hands full with the preparation of a popular description of my journey, which will be most copiously illustrated. The scientific results will be published later on in a work especially intended for scientific students.*

* About the high value of the cartographical and other material brought home by Dr. Sven Heden there can be no doubt. It is to be hoped that either through private enterprise or by the liberality of the Swedish Government it will be made available in full detail.—Ed. *G. J.*

THE INTERNATIONAL COUNCIL FOR THE STUDY OF THE SEA.

THE International Council for the Study of the Sea was constituted at Copenhagen on July 22, when delegates of the governments of the United Kingdom, Germany, Holland, Denmark, Norway, Sweden, Russia, and Finland met and drew up the constitution of the new body. Belgian co-operation is also expected, leaving France as the only maritime power of Western Europe which is not represented. As at the preliminary conference at Christiania last year, the British delegates were Sir Colin Scott Moncrieff and Prof. D'Arcy Thompson, accompanied by Dr. H. R. Mill and Mr. W. Garstang as expert advisers. The German delegates were Dr. Herwig, President of the German Sea Fisheries Association, and Prof. O. Krümmel of Kiel; Dr. P. P. C. Hoek represented Holland, Captain Drechsel and Dr. Knudsen with Dr. Petersen represented Denmark; Dr. Nansen and Dr. Hjort came from Norway; Prof. O. Pettersson and Dr. Tryhom from Sweden; Dr. Knipovich from Russia; and Prof. Homén and Dr. Nordqvist from Finland. The Danish Government acted as hosts, and welcomed the Council to Copenhagen, the leading part being taken by the Foreign Minister (who is also Prime Minister), M. Deuntzer. The King of Denmark received the representatives in the Amalienborg Palace, and expressed his personal interest in the work now commenced.

The work of the Council was carried on by two committees meeting simultaneously and reporting to the full meeting of the Council, which, after discussion, adopted their reports. As far as regards the oceanographical work, the recommendations of the Christiania Conference, which were fully described in the *Geographical Journal* for July, 1901 (vol. xviii. p. 77), were adopted, with a few slight variations shown by experience to be necessary. The principle of simultaneous observations four times a year as the basis of a system of regular observations of temperature, density, and plankton was confirmed, and the share to be taken in the work by each of the participating nations was practically settled. The two ships which the British Government has voted for the work will undertake periodical trips in the Færoe-Shetland channel and across the northern end of the North sea, working from a central harbour in Shetland, and also simultaneous trips in the western part of the English channel. It was found impracticable without a third vessel to undertake observations off the west of Ireland and Scotland, although the importance of studying the Atlantic was fully appreciated by the Council. The southern half of the North sea will be investigated by the Dutch, the northern half by the German ships. Denmark undertakes the sea between Færoe and Iceland, while Norway has the heavy task of making observations in the North Atlantic off the

extensive western seaboard of Scandinavia. Russia has undertaken similar work along the Murman coast and across Barents sea to Novaya Zemlya, while the Baltic will be studied in detail by Danish, Swedish, Finnish, Russian, and German ships.

While the periodical oceanographical trips are the framework of the whole system of observations, they are intended to be connected and completed by observations at fixed stations, such as light-ships and by the co-operation, as far as surface observations are concerned, of regular lines of steamers crossing the North sea and the Atlantic. The observations will be published by the Central Bureau of the Council as soon as possible after the termination of each quarterly cruise.

The biological work of the Council has been limited, by the conditions which most of the Governments concerned have attached to their grants, to the investigation of special problems of urgent practical importance to fisheries, from the study of which results may be expected within the short term of years for which the grants have been voted in the first instance. Two such problems were selected, and a special committee was appointed to direct the international work on each, each committee being under the charge of a *Geschäftsführer*, a functionary for whom the only possible English title is "convener," a convenient term familiarly used in Scotland, though scarcely known south of the Tweed. One committee has been charged with the duty of investigating the migrations of such fish as the cod and herring, with Dr. Johan Hjort, who has already done brilliant work on the subject as convener. The other is charged with the investigation of the whole question of over-fishing in the parts of the North sea most frequented by trawlers, and of this Mr. W. Garstang of the Marine Biological Station, Plymouth, will be convener. The latter is of special importance to British fisheries, as it deals with the possibility of the resources of the sea becoming exhausted by continuous fishing, and its report may possibly afford a basis for international action in protecting threatened areas. On both committees there are two British representatives, one for England and one for Scotland, and one representative of each of the other countries concerned.

The organization of the Central Bureau of the Council was also determined. Its personnel consists of Dr. Herwig as president, Prof. Pettersson as vice-president, Captain Drechsel as honorary treasurer, and Dr. P. P. C. Hoek as secretary. The seat of the Bureau is in Copenhagen, and the chief assistant will be Dr. Knudsen, lecturer on physics in the Polytechnic school there. All the publications of the Council will be issued by the Bureau, which will also form the medium of communication between the various national organizations, the special committees, and others.

The international laboratory has been established in Christiania, with Dr. Nansen as honorary director and Dr. Walfrid Ekman as

assistant for physical work; an assistant for chemical work is also about to be appointed. The laboratory will undertake the training of observers for the various national organizations, the testing of instruments, the supply of standard sea-water for controlling salinity determinations, and also gas-analysis. It will also carry out experiments with improved apparatus and methods in order to ensure a degree of accuracy never before aimed at in work at sea. It was recommended that the laboratory should, if possible, be opened in October, and that the periodical cruises be commenced as soon as possible, but at the latest by the spring of 1903.

An important experiment has thus been set on foot, which promises results of great interest and value if all concerned in kindred researches will co-operate heartily to make the work a success. The suggestion has been made in this country that the advantage of international co-operation will be greater to continental nations than to us; the fact is absolutely certain that the advantage will be granted to the nation that is best prepared to apply practically the scientific facts which may be obtained.

THE "SUDD" OF THE WHITE NILE.

By EDWARD S. CRISPIN, M.R.C.S., L.R.C.P.

Ever since Major Peake's sudd-cutting expedition it has been possible for steamers to go through from Khartum to Gondokoro (Uganda) by way of Lake No and the Bahr-el-Ghebel, and there is now a monthly mail service running that way; but at a place on the Bahr-el-Ghebel called Hellet-Nuer the steamer leaves the true river-channel, and for a distance of about 25 miles passes though a series of lakes in which the depth of water is only 4 or 5 feet. This channel, although up to date it has answered perfectly, was considered somewhat precarious, and the object of the Sudd Expedition 1901-1902 was to try and open the true river-bed.

The method here explained, with the aid of photographs taken, was that employed by Major Matthews, who commanded the expedition.

The first difficulty, when you are encountered by an endless barrier of sudd, is to discover where, in this sudd, the river-bed runs. This is done by a method of probing through the sudd; the average depth of water in the sudd is only a few feet, but when the true river-bed is reached this suddenly increases to a depth of 15 to 18 or 20 feet. Having found the river-bed, the first thing to do is to cut down or burn the top growth on the sudd, consisting mostly of papyrus. A curious and unexplained fact noted by Major Matthews was, that when the papyrus was fired the fire frequently spread along what was afterwards discovered to be the true bed of the river.

CAMP ON PIECE OF TRUE RIVER-BANK IN THE SUDD.

GENERAL VIEW OF NEWLY OPENED CHANNEL THROUGH SUDD, WITH SMALL SUDD ACROSS IT.

MEN LANDING FROM THE BOWS OF THE STEAMER ON TO A SUDD BLOCK WITH ITS TOP GROWTH OF PAPYRUS.

MEN ON SUDD BLOCK CLEARING THE TOP GROWTH.

TOP GROWTH CUT DOWN AND BLOCK CUT INTO SECTIONS.

STEAMER TOWING OUT BLOCK OF SUDD: MEN STANDING ROUND AND HOLDING THE HAWSER IN POSITION.

Having cleared the top of the sudd block, the men are landed with large saws to cut along the true river-bank, which may be either submerged with a few feet of water over it and papyrus and sudd on it, or solid ground with ant heaps, the solid ground never being of any great extent and always surrounded by swamp. Cross and parallel cuts are then made through the sudd, dividing it into blocks of a convenient size for the steamer to tear out; the size of these blocks, of course, depending on the consistency of the sudd and the power of the steamer.

Having cut the sudd into convenient blocks, the bows of the steamer are run into the block; the loop of a steel hawser, both ends of which

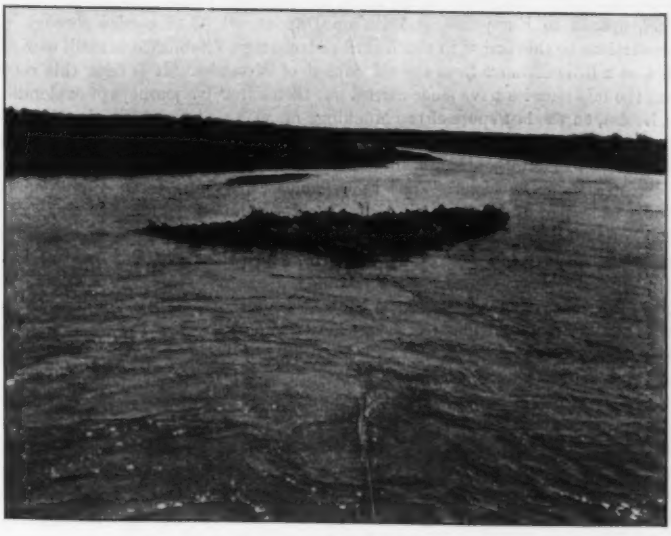
STEAMER TOWING OUT SUDD BLOCK.

are made fast to the steamer, is passed over the bows of the steamer, where it is taken by the men on the block, and placed in the trench cut and trodden down with their feet. The steamer then goes full speed astern, the men all standing on the hawser to keep it in position. In the case of tough sudd, as many as twenty trials may have to be made in this way before the block of sudd eventually tears away.

In the case of shallow light sudd, the hawser may be trodden down too deep and slip underneath, in which case the block will be cut free, but have to be towed out afresh.

When the block is torn out, the steamer goes slowly astern till it is towed clear into the current—if there is one—when it is cast adrift to

BLOCK TOWED OUT INTO OPEN WATER, MUCH DIMINISHED IN SIZE DURING ITS JOURNEY PARTLY BY COMPRESSION AND PARTLY BY THE FRONT EDGE ROLLING UNDER.



BLOCK LET GO IN OPEN WATER, FLOATING DOWN STREAM.

float down stream, where it is gradually disintegrated; if there is no current, it is towed to a piece of open water, where, as a temporary measure, it can be tied by ropes to the bank, leaving a wide enough channel for the steamer, and on the appearance of a current be cut adrift to float down stream.

The chief growths in the sudd are papyrus and tiger or elephant grass, a kind of bamboo growing to a great height, 20 feet or more. Up these climbs a creeper of a kind of convolvulus. Besides these there is abundance of ambatch and a long sword-grass that cuts like a knife, known as "oom soof." The steamer could cut its own way through this latter, which, in the presence of a current, would be broken up and float down stream, offering no obstruction. In its absence, however, it does not float away, but obstructs the steamer by constantly fouling the paddle-wheel. There was another very light kind of duckweed which covered some of the small open pools, and, in the absence of a current, was a great nuisance for the same reason.

GEOGRAPHICAL RESULTS OF THE EXPLORATIONS OF THE FRENCH "WHITE FATHERS" IN NORTH-EASTERN RHODESIA.

By HENRI MAITRE.

It was in 1895 that the "White Fathers" undertook their first expeditions to Lobemba. After the death of Mwamba, the paramount chief, the country was, in 1898, opened to Europeans, and Bishop Dupont, who had carried through the negotiations to this end with much skill and courage, established himself at Kibubula, at a little distance from the old capital of Mwamba. It is from this centre that the missionaries have since carried out their extensive journeys of exploration. In Lobisa, on the last spurs of the Muchinga range, a post was founded at Kilonga, almost at the source of the Pandafishiala, a subordinate feeder of the Lwitikira; while north of Lake Bangweulu, in the upper basin of the Liposochi, the station of "Notre Dame de Mweru" has been founded, and more recently still, on the middle course of the Chambezi, that of "Notre Dame de Bon Conseil." The whole of the districts of Lobemba and Lobisa have thus been traversed during numerous journeys, and the whole southern basin of the Chambezi and of Lake Bangweulu has been visited. Father Guillemé has navigated the lake, and the almost unknown region of the Luena and the Liposochi has been explored. The routes of the French missionaries form a veritable network over the whole country, and it is now possible to give an exact description of districts which but yesterday were all but unknown.

The whole of Lobemba is watered by the Chambezi, which, as is well known, rises in the western section of the Nyasa-Tanganyika plateau. Flowing first south-east in a clear and rapid stream, it receives a large number of brooks and torrents, and is soon swelled by the junction, on the right bank, of the Lukurishye and the Kyamfubo, the former an important affluent coming from the outer margin of the Ulungu highlands. The Chambezi becomes then an important stream, 80 yards wide and 10 to 13 feet deep, and flows at a rapid rate between banks bordered with gigantic trees, behind which stretches the plain dotted over

with stunted shrubs and brushwood. Soon, however, the aspect of the country changes, the banks being composed in turn of granite and sand, but almost everywhere covered with dense vegetation. The river presents a wild and imposing appearance, not a living being disturbing the quietude of its waters, into which many torrents precipitate themselves down its steep banks. In 10° S. it receives on the left a large tributary—the Kalungu—which rises in the western part of the Nyasa-Tanganyika plateau, and, swelled by the Chozi, carries a large volume of water into the Chambezi. The latter, now a large river, takes a south-westerly direction on meeting the Mukemye mountains and the imposing mass of the

Kilinda range, receiving on the right bank the Kalungu, which flows past the old capital of Ketimkuru, formerly ruler of the Lobemba country.

Soon after this the country becomes flat and marshy, the Chambezi flowing through the Central African "puri," which hardly changes its character until Bangweulu is reached. After receiving the Niuvushi from the southernmost outliers of the Kilinda range, the Chambezi turns south, spreading out into a vast marsh, beneath the waters of which its banks disappear. The surface is broken by clumps of reeds and thousands of conical anthills, mostly covered with twisted and stunted trees. During the dry season the width of this permanent inundation is about 12 miles, but it is much greater still during the rains. During the

summer there is not always even a narrow strip of land between the swamps and the river, which is itself a mile or more wide. It consists of several arms bordered by huge papyrus, the principal channels—three or four in number—being some 20 yards in width, and about 25 feet deep.

Further on the ground becomes gradually drier, and the river re-enters the "puri," still dotted over with anthills, but inundated only during the rains. In this central part of its course the Chambezi is narrower, the average width being about 30 to 35 yards, and the current tranquil. The right bank is wooded, and high. In this section its course is broken by a rapid, passable by boats only at high water, below which it receives the Lukulu coming from the western portion of the Kimpili mountains, which form the divide between Mweru and Bangweulu. The Lukulu, which flows generally south and south-east, is joined by many other streams—among them the Luombe, on the hilly banks of which the mission station of Kibubula is situated.

A little below the confluence of the Lukulu, the Chambezi is joined on the left by the important river Manshya, which, after issuing from the swampy lake Lishya Ngandu, 5 miles long, descends from the outer zone of the Muchinga uplands, and is afterwards deflected west by the Kaluabeni mountains. Its bed is encumbered by rocks and boulders. The last large tributary of the Chambezi on the right bank is the Lubansenshi, which comes from the Kimpili mountains, and in its upper course traverses a level country with a few isolated hills and some forest. Its lower course is parallel with that of the Lukulu. It is at the confluence of the Lubansenshi that the Chambezi estuary begins. It is roughly crescent-shaped, its axis running from north-east to south-west, and measuring some 25 miles in length, with a mean width of 1½, and a depth of some 16 feet. Its bed is strewn with islands, on one of which, in the central part of the estuary, is the village of the chief Kabinga. The river is here 2 miles wide and 20 feet deep. Almost opposite Kabinga, on the right bank, is the mouth of the Luangenge, a swampy stream with a short course, but wide and deep; while on the opposite bank the Chambezi receives the Lolingela, which descends from the spurs of the Muchinga range. A little above its mouth it has a width of over 2000 yards.

Below Kabinga's island the Chambezi continues to increase in width, but again narrows suddenly to some 400 yards, papyrus making its appearance at the same time. It is very difficult to determine the precise spot at which it enters the lake, for it splits up into numberless channels, some with open water and practicable for boats, but the greater number blocked by grass and reeds, which pass into the grassy expanse of Bangweulu on the northern horizon. The swampy tract extends to the south and south-west also, and across it winds the course of the river, which, according to the natives, passes into the Luapula, receiving, in the midst of the grassy expanse, the waters of the numerous tributaries which drain the country of Lobisa. Without a native guide, the traveller may travel for days amidst the labyrinth of similar winding channels and spaces of open water, only to be stopped at last under a barrier of grass and reeds. The whole southern part of Bangweulu is nothing but a vast swamp, through the western part of which the Luapula has made itself a channel, while to the east of the river is the same marsh and sea of papyrus in which the branches of the Chambezi with difficulty find a passage.

Of the numerous rivers of Lobisa which here join the Chambezi, the first is the Lwitikira, an important stream which takes its rise in a gorge of the Muchinga mountains. Its waters are there clear and rapid, and during the first 50 miles of its course it receives a large number of affluents, which make of this district one of the best watered tracts in Africa. The first of the larger affluents is the Mukungwa, which enters on the right bank, and, coming from the Eba mountains,

a range at right angles to the Muchinga, is itself joined by several tributaries. Soon after receiving these contributions to its waters, the Lwitikira enters a swampy plain, covered with veritable forests of papyrus, in which hippopotami disport themselves. It is at this part of its course that the Lwitikira crosses the "nikas," or wide salt-plains, which constitute the wealth of the country. The river is here joined by many streams from the Muchinga range, including the Mfubushi and its branches, draining the Kasenga mountains. Below the confluence of the Mfubushi the hills which border the Lwitikira close in and form a long series of rapids. Once more free from these obstacles the river flows north-west in a navigable section of some 40 miles, during which it is deep, but has an almost imperceptible current. About the middle of this part it receives on the right bank the Kankibia, its largest tributary, with a length almost equal to its own. The Kankibia, which has its origin in the central portion of the Eba mountains, is a fine river with clear water, flowing over a granite bed, and is some 80 yards wide in the central part of its course. Soon afterwards the Lwitikira enters Lake Buali, formed by its junction with the Musundushi. This is a small piece of water 5 miles long, and marks the entry of the river into the region of swamps, within which it unites with the Lumbatwa, a large southern affluent coming from the Kapunda mountains. This river has in its lower course a width of 100 yards, and flows at a rapid rate through the surrounding sea of papyrus. A lateral branch here diverges from the Lumbatwa, and links it with the Lukulu lua Manda, a large tributary of the Luapula, while other branches probably join the Lwitikira and the Chambezi.

The Lukulu lua Manda, the first left-branch tributary of the Luapula, which it joins after crossing the eastern swamps, rises in a narrow gorge among the Kafushi wa Manda mountains. In its upper course, during which it passes through the Kapunda mountains, it is rapid, and obstructed by rocks and rapids; but on reaching the plain it becomes free from these, though as it widens out it becomes choked with papyrus, which leave only a free channel of some 6 or 7 yards in width. At the border of the swamps it receives the Lulimalu, which drains the southern extremity of the Kapunda mountains, and in its turn receives the Luwe, a stagnant grassy stream near the banks of which Livingstone's tree once stood. The natives report that during the dry season the marshes of the Lulimalu are the resort of elephants, which return to the Lukulu during the rains. It is below the junction of the Lulimalu that the Lukulu receives the above-mentioned arm of the Lumbatwa. It then filters slowly through the marshes and joins the Luapula at their southern extremity opposite Lake Kampolombo. In the midst of these inhospitable wilds rise the miserable huts of the small village of Kafufwe; while further south, watered by the last affluents of the Lukulu, is the country of Lunga, covered with trees and anthills, but, during the rains, adding its quota to the boundless expanse of marshes.

NOTE.—The accompanying map must be regarded as provisional only, as it is based on rough sketches sent home by the "White Fathers."

REVIEWS.

AFRICA.

Uganda.*

Sir Harry Johnston's unrivalled descriptive powers, to which the students of African geography have been so much indebted in the past, have never been employed to better purpose than in the two handsome volumes now before us, which will enable the stay-at-home public to gain a clearer conception of the conditions of Nature and Man in the Uganda Protectorate than was ever before possible. Never was the importance of work of this kind so great as at present, both by reason of the increasing number of observers, whose results can only be generally available when gathered up and garnered by a master hand, and on account of the rapid change now in progress in African conditions, which gives a special value to all records of a state of things soon to be modified by advancing civilization.

In the subject-matter of his present work, Sir Harry Johnston has been singularly fortunate, for, as he himself remarks in his preface, the region under consideration contains, "within an area of some 150,000 square miles, nearly all the wonders, most of the extremes, the most signal beauties, and some of the horrors of the Dark Continent." In presenting these to the reader, the following plan is adopted: The opening chapters of vol. i. deal in turn with the separate provinces or regions of the Protectorate, the author's object being to supply, by vivid description, a picture of "what the country looks like;" these are followed by special chapters (illustrated by excellent maps) on the history—early and recent—commercial prospects, meteorology, geology, and natural history. This concludes vol. i. of the work, the second volume being occupied entirely with the races of man, the affinities and characteristics of which are treated with great thoroughness. Amid all this wealth of material, it is, of course, impossible to give here any detailed account of the contents of the several sections, and the few passages which can be specially referred to must be taken as samples of the admirable way in which the whole country is brought before the mental eye of the reader.

In the descriptive section a most useful feature is the attention paid throughout to the types of vegetation, and the part played by them in determining the general aspect of the landscape. The eastern province, now attached to the East Africa Protectorate, included both the rift-valley † and the zone of high plateaux on its west, which the author groups under the general designation Nandi, probably to become the site of true European colonization. Here the traveller is constantly reminded of the scenery of Great Britain. "Everywhere the landscape is gracious and pleasing in a quiet, homely way, offering few violent forms or startling effects. It is thus singularly homelike, and, as it is almost entirely without native inhabitants, it seems to be awaiting the advent of another race which should make it a wonderland of wealth and comfort." It lies "at an average of 4000 feet above the Victoria Nyanza, of whose silvery gulfs and ghostly mountain coast-line glimpses at a distance of 90 miles may be caught occasionally from some breezy height or through the interstices of woods which themselves might be in Surrey." Of

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* 'The Uganda Protectorate.' By Sir Harry Johnston, G.C.M.G., K.C.B. London: Hutchinson. 1902.

† Sir H. Johnston appears doubtful as to the southward extension of the rift-valley beyond Lake Rukwa. The intimate connection between the valleys of Rukwa and Nyasa has, however, been conclusively shown by German observers, such as Bornhardt and Kohlschütter.

Kavirondo, forming part of the central province, we are told that it was once a forest-land, but now consists of breezy rolling downs, gay with flowers, "covered with the greenest of grass, and made additionally beautiful by the blending with the green of fleecy white, shining mauve, or pale pink, effects which are caused by the grass being in flower or fluffy seed." We must not follow the author in his description of Mount Elgon, with its forests, caves, and waterfalls, or of the Victoria lake, with its island-fringed shores and central stormy wastes, hardly visited by man, but may linger a moment in Uganda proper, "a country intended for switch-back railways," with its downs, marshes, and rich woodlands, often blazing with flowers, and full of colour and noise from the birds, beasts, and insects frequenting them. More enthralling is the interest aroused by the chapter on Ruwenzori and its snows, of which the author has already given a fairly full description in the *Journal;* while the account of the gloomy forests of the Semliki, the home of the Okapi, with their possibilities in the way of fresh zoological discoveries, forms a fitting conclusion to as striking a series of word-pictures as has yet appeared in African literature.

The historical chapter describes in outline the probable movements of population within the territory from the earliest times, sketching also the course of European discovery and political activity. The author is inclined to think that the early Egyptians may have had some dealings with the lands of the Nile sources, and likewise attributes to Ptolemy a greater knowledge than is conceded by some writers. A series of maps shows the ideas prevalent at various epochs respecting this part of Central Africa. While pointing out with justice that the mapping of the sixteenth and seventeenth centuries had its origin in the extraordinary southward extension of Abyssinian geographical features then current, the author is hardly correct in attributing these mistaken ideas to the Portuguese; nor do the maps assigned to 1877 and 1884 give a fair idea of the relative position of knowledge as the result of Stanley's and Thomson's journeys, the second being, in fact, Stanley's final map, with but one or two modifications in detail. Again, it appears to have escaped the author that the first knowledge of several of the names and geographical features (Naivasha, Elgon, Nandi, etc.) was due to Wakefield's researches, the results of which were published by our Society so early as 1870. These, however, are minor points, and do not affect the general value of the chapter.

The subject-matter of the chapter headed "Commercial Resources" was, to a certain extent, dealt with in Sir Harry Johnston's official report to the Foreign Office, and the main conclusions have already been summarized in the *Journal*. Regarding the soil of Uganda and the possibilities of agricultural development, it is said that the question generally put is, "What will not grow and flourish in Uganda?" Tomatoes, *e.g.*, grow quite wild, and an instance has been noted of a single plant yielding three thousand fruits in two months. As regards trade, it is stated that two subsidized German firms are pushing ahead rapidly, while British firms are inclined to hold their hands. Apart from the development of the country itself, Sir Harry Johnston thinks that the people might gain a source of wealth by going as labourers to South Africa, under proper guarantees and for reasonably short spaces of time. From the point of view of climate and temperature (a subject also touched upon in the official report), the area is divided into five regions, of which the second, or plateau region (Nandi, etc., with isolated areas on Mount Elgon and in Ankole), is considered to have a well-nigh perfect climate, while in the third or forest region (parts of Uganda proper, etc.), heat rarely causes great discomfort. In the first or arid region of the north, and the fourth or Nile region, the conditions are naturally less favourable, while the fifth, or alpine region, is necessarily of small

extent. Botanically, too, five regions are defined, the poorer Somali and East African regions passing westward through the Central African region (abounding in grass, and remarkable for its brilliantly coloured flowers) into the West African forest region, which embraces much of the country north of the Victoria Nyanza as well as in the Semliki valley and elsewhere. Mr. C. H. Wright gives a provisional list of plants occurring in the protectorate, based on the materials at Kew, but it is of course by no means exhaustive. The number of common Indian genera represented seems at first sight striking, but many of these (*e.g.* Terminalia, Crotalaria, Erythrina, and others) are widely distributed over the tropics of both hemispheres. The small number of species catalogued from such orders as *Myrtaceae*, *Anacardiaceae*, and *Scytamineae*, all well represented in India, is somewhat surprising, but may no doubt be due to the chance absence of specimens of these in the collections at Kew.

The author's more special subject, zoology, is treated at much greater length, and with the aid of the admirable reproductions of his paintings and drawings, we gain a very complete notion of the varied animal life of the territory. The coloured illustrations, both of the animal and vegetable productions and of landscapes, are quite a unique feature in the work, and bring home to the mind the richness and variety of the colouring more vividly than could be done by pages of description. Especially charming are the pictures of birds, from the homely little chat, which characterizes the rift-valley, to the gorgeously coloured plantain-eaters, barbets, or flamingoes, while those of the flowers show that portions at least of Uganda form a veritable garden. Although the dark side of African life is not kept wholly in the background, the book gives a far more pleasing idea of African characteristics than has been derived from the somewhat jaundiced accounts of more than one previous traveller, and certainly induces a belief that the efforts made to develop the country have not been misplaced.

It is impossible here to give any adequate notice of the second volume, for pages would be required to give a just idea of even its most important features. The region dealt with presents an unusual number of ethnological problems, forming as it does a borderland in which most of the great divisions of the African peoples are represented. Never before, it may be safely said, has such a large body of information been brought together, whether from the point of view of physical anthropology, linguistics, or the beliefs, manners, and customs of the various tribes. The anthropometric observations made by the author and his assistant, Mr. Doggett, and summarized by Dr. F. C. Shrubsall, will long form an indispensable basis for future study, while the author's original researches into the language questions, especially with reference to the Bantu dialects, are of the highest importance for the solution of the race-problems of the continent as a whole. The very complete study which he has made of the pygmies of the Congo forest are likewise of special value in view of the practical certainty that the primitive life hitherto led by these interesting people must soon suffer considerable change, even if the race is not doomed to actual extinction. The abundant illustrations of native types will also be of great value to students. They include many which it is difficult to look at without experiencing a feeling of repulsion, but others again, such as the Jaluo or Nilotic Kavirondo, are distinctly fine specimens of humanity. The Jaluo are of special interest, both as forming a sort of Nilotic enclave amidst an otherwise Bantu population, and from the existence among them of beads which are said to be certainly not European, but are supposed to have found their way from the north in very ancient times.

Sir Harry Johnston's views as to the origin and migrations of African peoples, which have been already put forward in previous works, are here developed in

greater fulness, and merit careful consideration even by those not disposed to accept them in their entirety. His estimate of the capabilities of the Negro race, when untouched by outside influence, should serve as a useful corrective to the too enthusiastic praises bestowed upon it by some of its admirers. Thus, in the history of the Hima race and its threatened absorption by its more prolific neighbours, he sees but "another instance of the attempts . . . of the Caucasian species, through its Hamitic and Libyan branches, to improve the physical appearance and intellectuality of the naturally ugly and degraded Negro."

E. H.

AMERICA.

Charlevoix's 'New France.'*

It is disappointing to find that these volumes are in substance only a re-issue of the late Dr. Shea's translation of Charlevoix's 'Histoire de la Nouvelle France,' published at New York in 1866 and the years following. The account of the translator, with a list of his writings, prefixed to the first volume, adds little to the value of the work; this list appears, moreover, if we may judge from the copy presented to the library of the Royal Geographical Society, to break off in the middle of a paragraph at the foot of p. xiv.

Dr. Shea, apparently with the view of abridging his undertaking, omitted the 'Journal Historique' which forms the third volume, and by no means the least interesting section, of the original work. Perhaps the fact that two English versions of the journal were in existence, one published in 1761, the other in 1763, had something to do with this decision. These translations have not, so far as we know, been reprinted; and a reprint of one of them, with a few necessary annotations, at the end of the present re-issue, would have proved acceptable to a wide circle of readers, and would have had the effect of presenting them with a complete translation of the work of Charlevoix. It is true that the 'Journal' relates to a journey undertaken by order of the French king more than twenty years before the historical portion of the work was written. This circumstance does not diminish its value; and as the author omits in the professedly historical section of the work a good deal of valuable matter which is contained in the 'Journal,' the book is obviously incomplete without it.

It may possibly be a mere coincidence that Charlevoix was engaged in compiling the work during the latter part of the thirty years' peace between France and England which followed the Treaty of Utrecht; and that its publication coincided, or nearly so, with the French declaration of war against England in 1744. More probably, however, it was written to order at a time when France cherished the hope of recovering her position in North America; a suggestion strengthened by the fact that the archives of the Ministry of Marine were ransacked to furnish it with the excellent maps which at the present day constitute its chief value. These maps, executed by Nicolas Bellin, the royal cartographer, were an immense improvement on any maps of French North America previously published, and are still interesting and valuable. It would be curious, but for the circumstances of the publication, that Bellin utterly ignores the curtailment which the French dominions had suffered at the Treaty of Utrecht; for Hudson's bay, the whole of Newfoundland, and even Nova Scotia with the peninsula of

* 'History and General Description of New France.' By P. F. X. de Charlevoix, S.J. Translated from the original edition and edited with notes by John Gilmary Shea. With a New Memoir and Bibliography of the Translator, by N. F. Morrison. Six vols. London: Francis Edwards. 1902.

Acadia, are coolly represented as still forming part of New France. The maps, eighteen in number, are reproduced in a style which leaves nothing to be desired, and the book, notwithstanding its incompleteness, should find a place on the shelves of many libraries on both sides of the Atlantic.

E. J. P.

POLAR REGIONS.

Dr. Nansen's Third Volume of Scientific Results.

It is difficult to attempt to summarize the immense mass of material contained in this very substantial volume,* the contents of which prove Dr. Nansen's determination to subject all the results of his expedition in the *Fram* to the most exhaustive criticism. There are two memoirs of unequal length. The later and shorter, on "Hydrometers and the Surface Tension of Liquids," is the account of an interesting physical research as a result of which the use of stem-reading hydrometers, on whose indications our knowledge of the salinity of the ocean very largely depends, is condemned except when extraordinary precautions are taken. It would scarcely be appropriate here to discuss the experiments which have led Dr. Nansen to take up a position so completely opposed to that of such an authority as Mr. J. Y. Buchanan; but without accepting as final the judgment passed on partially immersed hydrometers, we are quite prepared to believe the excellent character given to the newer form of instrument, the hydrometer of total immersion.

The main interest of the volume to geographers is the discussion of "The Oceanography of the North Polar Basin," which occupies 427 large quarto pages, and is illustrated by 33 plates. The observations are described in great detail, supplemented by the discussion of many experiments made since the return of the expedition, and the results are finally treated so as to elucidate the circulation of the water in the Arctic sea. It may be the simplest way of explaining Dr. Nansen's method and its outcome if we refer to the chapters in their order.

Part I. deals with the temperature of the water in the North Polar basin, treating first of the instruments, their construction, corrections, and method of use, and second of the observations. A large part of the discussion is occupied with the corrections necessary in order to obtain temperature readings to one-hundredth of a centigrade degree. We cannot agree with Dr. Nansen that such high accuracy is possible in oceanographical work, and we would be well pleased to have readings that could be absolutely trusted to one-twentieth of a degree. The observations include surface readings made every four hours on the voyage out, and, subsequent to the freezing in of the *Fram*, daily or at longer intervals, in a hole broken through the ice. These are set out at length in nearly forty pages of tables. The deep-sea temperatures are then given, but these are not so numerous as they would have been if the great depth of the water had been suspected beforehand. As is well known, a wire sounding-line had to be prepared on board, and as it gradually wore out, great care had to be exercised to avoid the loss of instruments. During the drift the soundings were taken from the ice. On nine occasions temperatures were obtained from depths exceeding 1000 fathoms, and one of these was in 85° 28′ N.

Part II. treats of the specific gravity and salinity of the water of the North Polar basin. The methods employed are described and criticized, and nearly fifty pages are occupied with the tables of hydrometer readings, the accuracy of which did not satisfy Dr. Nansen, although they certainly form a distinct and valuable addition to knowledge.

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* 'The Norwegian North Polar Expedition, 1893–1896. Scientific Results.' Edited by Fridtjof Nansen. Vol. iii. London: Longmans, Green & Co. 1902.

Part III. is entitled "The Circulation of the North Polar Basin." It commences with a statement of the final values of the temperature and salinity observations made at various depths below the surface during the expedition, which differ from those published in the earlier part by the application of some additional corrections. The conditions of the water in the Barents and Kara seas are next discussed, the observations on the *Fram* being reinforced by simultaneous observations from a Russian surveying-vessel, and by reference to the earlier work of the *Willem Barents*, and also to later work. The Kara and Siberian seas are then considered, but the data are few, as little but surface observations could be made from the *Fram*. The most interesting observation in the shallow Siberian sea was that neither the work of the *Fram* nor that of the *Vega* proved any distinct easterly current along the coast from the great Siberian rivers, which seem on the contrary to set up a movement towards the north-west.

Interest is naturally concentrated on the section dealing with the North Polar basin itself, that great unknown sea across which the drift of the *Fram* made a line of observations possible for the first time.

The main result is very clearly established by the observations, and it may be stated in Dr. Nansen's own words—

"The uniformity with regard both to temperature and salinity, especially of the deep water of the whole of this sea, is striking, as is also the great and sharply defined difference between the shallow water, above 200 metres, and the deep water, deeper than 250 metres. In all the series we have a minimum of temperature at from 70 to 80 metres, and a maximum at from 300 to 400 metres, below which the temperature gradually sinks to a second minimum near the bottom. The salinity, however, increases rapidly from the surface to about 200 or 250 metres, where it is about 35·2 ‰, and thus it remains, almost unaltered, to the bottom.

"It at once becomes evident that we have here two different kinds of water. The surface of the sea, between 0 metres and 200 metres, is covered with water of low salinity and low temperature, the *genuine polar water*; while the sea from 250 metres to the bottom is filled with water of a very high salinity (35·2 ‰ or 35·3 ‰) and of a relatively high temperature, being above zero centigrade between 200 or 250 metres and 700 or 900 metres. From 400 metres or 500 metres the temperature gradually decreases downward, yet without reaching the low temperature of the upper polar water. The comparatively warm and saline water has evidently its direct origin from the *Gulf Stream* of the Atlantic ocean."

The fresh cold upper layer of water is traced to its origin in the dilution produced by the great rivers of Siberia, the salinity being lowest near the continental shores, and gradually increasing towards the north.

The intermediate warm water appears to be that of the Gulf Stream entering the North Polar basin, and deviated by the Earth's rotation to the right, passing eastward along the continental slope; but, cooling as it goes, it ultimately becomes cooled down to the temperature of the surface and spreads through the deepest part of the basin underlying the still imperfectly cooled Gulf Stream water that continues to flow in. The deep cold water probably circulates very slowly, and may not be renewed once in a century or more. The slight rise of temperature in the very deepest layers is attributed to the effect of the internal heat of the Earth; and taking all considerations into account, the circulation of the water as a whole must be of an extremely complicated kind.

The evidence for the existence of a permanent surface current in the North Polar basin is treated very fully with the aid of a number of maps showing the direction of the wind in relation to ice-drift. The periods when the wind resultant was zero, *i.e.* periods in which the same amount of wind had been registered from

diametrically opposite directions, were determined, and on examining the movement of the ship embedded in the ice during these periods, it was found to show a drift of from 0·45 to 1·00 sea-mile in twenty-four hours, at first north-westerly, then westerly, and subsequently south-westerly and nearly south. The varying directions, when plotted on a globe, will be found to give a nearly straight line across the North Polar basin, from the Siberian to the Greenland side, and it is noticeable that the rate of drift increases towards the west. The whole question of wind-drift and currents is discussed theoretically, and great stress laid on the influence of the Earth's rotation in deviating the currents to the right, an effect which, it is pointed out, increases with the depth. As a final result, Dr. Nansen concludes that a vessel entering the drifting ice north or north-east of Bering strait would be carried much further north than the *Fram*, and with a greater speed; but that beyond a certain latitude the current would slacken in its velocity.

In discussing the causes of the circulation in the polar basin, Dr. Nansen dissents from Prof. Pettersson's views as to the supreme importance of ice-melting as a motive power, and in referring to secular changes of climate in the far north, he expresses the opinion that a higher sea-level, admitting a greater volume of warm Atlantic water, would possibly account for the more genial episodes to which the shells on the raised beaches of Franz Josef Land bear evidence.

The maps illustrating the memoir are on a large scale, and very clearly drawn; one of the configuration of the bed of the Barents and Kara seas is peculiarly interesting, as showing the complicated submarine topography of the margin of the polar basin, a subject on which we understand Dr. Nansen will have more to say on a later occasion. Taken as a whole, this memoir is perhaps the most important contribution to oceanographical science since the work of the *Challenger*.

THE MONTHLY RECORD.

EUROPE.

The Austrian Hydrographic Service.—The Central Bureau of the Hydrographic Department was established in Vienna in 1893, for the purpose of dealing with the constantly recurring dangers from floods in different parts of Austria, by organizing a hydrographical service on scientific principles, drawing up proper regulations, and taking practical steps to minimize the loss and damage occasioned. The annual reports of the department are of great geographical interest, from the immense amount of data they contain relative to the behaviour of streams and rivers. The seventh report, just issued, contains the results of observations for the year 1899. The number of rain-gauge stations has increased from 861 in 1893 to 2819 in 1899—128 having been added during the year—and the number of stations recording water-level from 493 to 1271. Measurements of snow-line were made at 984 places in the course of the year. The area under observation included 300,000 square kilometres (115,800 square miles) within the country, and 120,000 square kilometres (over 46,000 square miles) beyond the frontier, including Hungary and Bosnia. Data for the external areas were supplied by the departments of the respective districts. The rainfall measurements were made, in the great majority of cases, with identical instruments, and according to a uniform system, and the irregularities still existing in Bohemia, Moravia, and Galicia, are being steadily reduced in number. The observations are classified according to river basins, so that the fifteen sections of the report vary in length from 50 to 320 pages; the details of each are represented graphically by diagrams and sections, and a map on

a scale of 1 : 750,000 shows the distribution of rainfall. As points of special interest in 1899, we may note the following. No rain was recorded at any station in Austro-Hungary on March 13 and 14, or on the first days of November. Riesenhain, in the Riesengebirge, Northern Bohemia, had the greatest number of rainy days (over 1 mm. of rainfall), and Tscherms, near Meran in Southern Tyrol, had the least, the numbers being 203 and 44. The heaviest falls occurred near the coast, a Dalmatian station recording more than 20 mm. on 60 separate days. In the March (Eastern Moravia and Lower Austria) the rainfall did not amount to 20 mm. on a single day. The mean rainfall over the whole area was 980 mm. for the year, about 10 per cent. above the long-period average. The water-level values are calculated for a "hydrological year" from December 1 to November 30, with the object of including the whole period of winter or ice conditions in one season. The generally mild winter of 1898–99 did not occasion extensive freezing of the rivers, but only the Lower Adige, the Isonzo, and the Dalmatian streams remained entirely free from ice. The melting time in spring was marked by strong oscillations, and a general tendency to rising waters; in some places the Adige reached its maximum in May, but the Drave, Save, Upper Rhine, Upper Vistula, and the coast streams only attained their highest as the result of heavy rains in July. The Danube oscillated above its mean level during the whole of July, under the influence of snow melting in the mountains. In September occurred the great floods, which were the most disastrous of the nineteenth century, exceeding even those of 1897. During the same months the Dalmatian streams were unusually low.

ASIA.

The Hejaz Railway.—In his report on the trade of Damascus Mr. Richards gives some details concerning the Hejaz railway, which, he thinks, will at least be carried as far as Ma'an, a distance of 290 miles. The entire distance between Damascus and Mekka is 1100 miles, and the most favourable estimates of the cost of construction are £5,000,000 sterling, while by others an expenditure of twice this amount is thought probable. The absence of water, desert conditions, and hostility of the Bedawin render the task difficult, but it must be admitted that the progress made during the last fourteen months has not been unsatisfactory. On one section of the line, from Mezerib, the terminus of the already-existing Hauran railway, to the 39th kilometre, the work of construction has been carried on by some 2000 of the Imperial troops, who do as well as any of the workmen engaged, with the exception of the best of the foreigners, who are for the most part Italians. It is hoped that the line will be completed as far as Ain Zerka—distant 62 miles from Mezerib, and therefore 125 miles from Damascus—by September of the present year.

The Connection of Ceylon with India.—Recent railway development both in India and Ceylon has brought the question of inter-communication once more before the public. On the Indian side the opening of a new line from Madura to Mandapam carries the railway practically to one end of the bridge, while in Ceylon a line is now under construction running northwards to the extremity of the island at Jaffnapatam. From this latter it is suggested that a branch line should be made from Madawachi to the island of Manaar, the other end of the bridge, and if the South Indian Railway be extended to Point Ramen, and thence by a causeway of 1¼ mile in length to the island of Rameswaram, there would be only a short stretch of intervening water—about 40 miles—to cross. The steamer service would be most favourably circumstanced, running on the south side of the islands during the north-east monsoon and on the north side during the south-west.

It is thought that considerable development of the trade of Southern India and Ceylon should follow the completion of this project.

Surveys and Scientific Work in French Indo-China.—During his governorship of French Indo-China, M. Doumer has bestowed much attention on the prosecution of the mapping of the territory, which has been put into the hands of a "Service Géographique," of which Colonel Lubanski is director. According to a note in the June number of *La Géographie*, a map of the delta region of Tongking has been undertaken, on the scale of 1:25,000. This map will be based on precise geodetic methods, and when complete will embrace seventy-two sheets. By May last, 7280 square kilometres (2800 square miles) had been surveyed, and it is expected that the first twelve sheets will be published within the next few months. The field-work will probably be completed in 1903. Several other large-scale maps of portions of French Indo-China have either been published or undertaken. A scheme has also been set on foot by M. Doumer for the scientific exploration of the territory from the point of view of geology and mineralogy, zoology, botany, and anthropology. At the head of the organization there will be a director holding office for three years at a time, while two experts will be attached to each of the above sections.

Kang-wha, Korea.—This island, on account of the strategic importance of its situation off the west coast of Korea, at the mouth of the river on which stands Seoul, has had a stirring history extending over at least a thousand years. In the Proceedings of the Korea branch of the Royal Asiatic Society, the Rev. M. N. Trollope prefaces an account of the part it has played in history, notably during the Mongul invasion of the thirteenth century, the Manchu invasion of the seventeenth, and the French and American expeditions in recent times, by a short geographical description. Kang-wha is about the same size as the Isle of Wight, and is crossed from west to east by four parallel ranges of mountains. The broad fertile valleys, with lateral coombe-like hollows, which lie between these ranges, are well cultivated, and a good deal of land at the mouths of the valleys has been reclaimed from the sea for agriculture by the erection of massive dykes. In rural parts, the dwelling-houses are often hidden away in the hollows, in order to be sheltered from the piercing north-west winds—a practice which gives the country the deserted aspect when viewed from a distance that is noticeable in many parts of Korea. Agriculture is the staple industry of the population, which probably numbers slightly over 30,000, though a small percentage of the people are employed in stone-quarrying, mat-making, fishing, etc. The city of Kang-wha stands to the north-east of the centre of the island, and, in spite of the fact that it consists chiefly of straw-thatched houses, must present quite an imposing and picturesque appearance, with its fortified city walls, pavilioned gateways, and bell-kiosk. Its present military importance, however, does not nearly approach that of former days, since enemies desiring to capture Seoul would probably now march *viâ* Chemulpo, and modern artillery would prevent its being a safe refuge for king or government. The city contains seven Buddhist monasteries, and just outside it is the famous one of Chun-deung Sa, surrounded by a battlemented stone rampart. The present influence of Buddhism is, however, very slight, and many of the monasteries and temples, once numerous in the island, have long since perished. Altogether, Kang-wha appears to have lost the important position that it once occupied in the estimation of the Koreans, and with this many of the glories of the past, but it is a mine of wealth for those interested in Korean history.

AFRICA.

Antiquities of the Egyptian Sudan.—With the re-establishment of settled government under British auspices in the Egyptian Sudan, it is to be hoped that new light will be thrown by the researches of competent students on the antiquarian remains scattered over a large part of the area, which, though studied to some extent by travellers such as Cailliaud and Lepsius in the early part of the nineteenth century, still offer a most promising field for further investigation. The importance of the old Ethiopian kingdom, of which Meroe was the capital, and which possessed a civilization closely related to that of later Egypt, has long been generally recognized, but it is not so widely known that this had its successor, to some extent, in a Christian kingdom which flourished here for some centuries after the conversion of the Nubians to Christianity. The most important remains dating from this epoch are at Soba, on the Blue Nile, 30 miles south of Khartum, an investigation of which has lately been carried out by Colonel Stanton, Governor of Khartum, who has entered into their study with much enthusiasm. Some account of the discoveries so far made is given in an article on Khartum by Mr. John Ward, F.S.A., in the August number of the *Monthly Review*, who gives reproductions of photographs showing a Christian basilica and other buildings, marking a transition from the Egyptian to the Roman style. Colonel Stanton also reports ruins in the south of Kordofan, which he is inclined to ascribe to the same epoch, and he has apparently found traces of Christian influence at the well-known ruins of Naga, from which a highway—also strewn with ruins—seems to have led across the desert to Soba. It is to be hoped that steps will soon be taken by the authorities for the proper preservation of such antiquities as may yet be discovered.

New Ascent of the Volcano Kirunga Cha Niragongwe.—Recent numbers of the *Deutsche Kolonialzeitung* (June 12 and 19) contain a graphic account of a new ascent of the western volcano of the Kirunga group, generally known as Kirunga cha Gongo, but which the writer of the narrative, Lieut. Schwartz, says should properly be called Kirunga cha Niragongwe. The ascent was made, apparently, last December, in company with Dr. Kandt, with porters and native guides. After a march across the gently rising plateau from which the volcanoes rise, camp was pitched at the foot of the mountain on its south-east side. Even here the cold mist rendered two thick blankets acceptable at night, although the mountain lies almost on the equator. The following day the march was resumed, in spite of rain, up the bush-covered slopes, use being made of a path apparently cut by elephant-hunters, which enabled the party to arrive the same evening at the open slopes above the forest zone, whereas the passage of the latter had occupied Count von Götzen, who made the first ascent, three and a half days. During the march, after the upper level of the clouds had been passed, the rain ceased, and views were obtained into the extinct southern crater of the mountain, the walls of which were steep and wooded, and over the plain to the south, which with its many small extinct craters recalled a lunar landscape. Camp was pitched above the trees, the night scene being extraordinarily impressive, and the final ascent to the main crater made the following day. After a time the Wahutu guides remained behind through dread of the spirit of the mountain, and even the regular caravan porters were probably only reassured by the presence of the Europeans. The account of the crater and its environs agrees on the whole with Count von Götzen's, but the depth of the crater is estimated at only some 350 feet. The volcanic vent is said to be of the shape of an 8, which would seem to imply that the two shafts seen by Von Götzen have since coalesced. The crater walls are composed of very well-defined strata, black, whitish, and red in colour. The descent of the mountain was

more difficult than the ascent, owing to the steepness of the broken lava-slopes. The altitude of Kirunga cha Niragongwe has been found by Captain Herrmann (by trigonometrical measurements) to be 11,200 feet, while that of the higher eastern peak, Karisimbi, is 14,760. From a recent number of the *Deutsches Kolonialblatt* (August 1) we learn that Lieut. Schwartz has also ascended Mt. Namlagira, from which lava-streams still continue to flow.

Return of the Kivu Delimitation Commission.—The German Commissioner, Captain Hermann, has now reached Europe, bringing with him a large amount of new material for the mapping of the Kivu region. According to the *Deutsche Kolonialblatt* for August 15, the triangulation, for which a base line was measured near the station of Usumburu, extends from the north end of Tanganyika along the eastern shore of Kivu (including the island of Kwijwi) to the summits of the Kirunga volcanoes and the intersection of 30° E. with 1° S. The map, much of which has been constructed on the spot, will be on the large scale of 1 : 100,000, and will include the results of Dr. Kandt's surveys.

Count Wickenburg in East Africa.—Count Wickenburg has been unable to carry out his intention (*Journal*, vol. xix. p. 216) of extending his explorations in East Africa, after his first crossing of the Galla and Somali countries, to the region between Lake Rudolf and the Nile. After making his way across the Tana to Ukamba, and being much hindered by scarcity of water, he made his way to the upper Tana, but was finally forced to return to the coast, owing to the outbreak of the plague at Nairobi and the enfeebled state of his caravan.

The Shrinkage of Lake Nyasa.—Mr. Commissioner Sharpe's report on the British Central Africa Protectorate, just issued by the Foreign Office, has some important notes on the alteration in the level of Lake Nyasa, of which for some years past careful records have been kept. On April 1, 1902, the lake was lower than it has been for six years, which points to difficulties in the navigation of the Shire river during the months of August, September, and October. On April 25, 1902, the level was 3 feet 6 inches below that on the same date in 1897. Monthly soundings are taken on the Fort Johnston bar, where the Shire leaves the lake, and records have been kept of its condition since 1895. It is possible that there may be some silting up during the dry season, but Lieut. Cullen considers this must be very slight. He thinks, however, that there are regular tides on the lake, though the rise and fall may not be more than 5 or 6 inches. Fort Johnston bar was impracticable for the lake steamers from August, 1901, to February, 1902. Mr. Sharpe remarks upon the very clear and distinctly defined water-mark which can be seen on the rocks all round the lake, and is by measurement 11 feet 7 inches above the present level, and he thinks that at some previous period before the advent of Europeans there must have been a sudden subsidence of the lake. The rainfall throughout the protectorate during the past season has been a good one.

The Mountain Flora of Northern Nyasaland.—The geographical and ethnological results of the German expedition to the countries north of Lake Nyasa, organized by the aid of the *Wentzel-Stiftung*, have already been alluded to in the *Journal*. The results of the botanical researches carried out by Herr Goetze, which formed the main object of the expedition, are summarized by Prof. Engler in the *Sitzungsberichte* of the Prussian Academy of Sciences (February 27, 1902). The region of the Kinga or Livingstone range, to which especial attention was paid, had previously been practically an unknown region from a botanical point of view, so that the results in this direction are of much interest. Prof. Engler divides the region in question into eight distinct botanical formations, beginning with (1) the alluvial land of the Konde plain, the lowest part of the whole area, and passing through the formations of the lower slopes to those of the highest summits. Up

to 1700 metres (5580 feet), and in places up to 2000 (6560 feet), steppe-like formations are the prevailing feature, but in ravines exposed to the influence of the moisture which ascends from the lake, and along river-banks on the plateaux, moist mountain forest occurs (No. 2 of the series). The steppe formation of the lower grounds (No. 3) consists chiefly of grasses, but contains some bush and trees, including acacias, Borassus, and a new species of Hyphæne palm. Above 1200 metres (3940 feet) we find a xerophilic formation of mountain bush and dry forest (No. 4), containing forms of wide distribution in East Africa, and even extending to Angola. This dry region ascends in places to a considerable altitude, but elsewhere, above 1400 metres (4600 feet), mountain grass-lands, with interspersed trees and bush presenting a park-like aspect (No. 5), are common. The next two formations (Nos. 6 and 7) occupy similar zones of altitude. The high-level forests, which begin with the appearance of bamboos at 2100 metres (6900 feet), are sometimes continuous with the lower moist forests, but more often a xerophilic formation intervenes, the moisture from the lake not making its influence felt until near the summits of the mountains. The character of these forests varies on the two versants of the mountains; thus species of juniper and podocarpus, which are common in ravines on the side towards Lake Nyasa, are almost absent on the northern side. These upper forests contain many species found in Abyssinia, Kilimanjaro, and elsewhere. The seventh formation is that of the upper mountain pastures, which are especially rich in species on the plateaux; while the eighth and last, which occurs above 2700 metres (8850 feet), consists of the stunted bushy plants which find a footing among the rocks of the mountain summits.

The Kingdom of Loango.—Mr. R. E. Dennett, who has so long resided as a trader in the region of the Lower Congo, and is well known for his writings on the Fjort, or Fiote, the inhabitants of the old kingdom of Congo, sends us some notes on the kingdom of Loango (inhabited by the Bavili) and neighbouring districts, in which he has lived during the past eight years, his earlier researches having been made principally more to the south. He begins by referring briefly to the vice-kingdom of Kakongo, lying just north of the Congo river, which, together with Loango and still more remote districts to the north-east, he considers to have been an integral part of the old Congo kingdom at the height of its power. One of the Kakongo provinces, Ngoyo, was, in fact, he says, the "mother province," as Sonyo, south of the Congo, was the "father province" of that kingdom. It is the inhabitants of this province who have become generally known as Muserongo (a corruption of Mu-si-Ngoyo, "a man of Ngoyo"). The country is traversed by four roads, called by the people Nzila Nyambi, or "God-made roads," which run north, south, east, and west from the central province of Kakongo. The kingdom of Loango is reached by the Nzila Bavili, or north road, which eventually leads through the province of Chindendi across the Loango Luisi river to the holy ground or meeting-place of Buali, the central province of Loango. Here again is a meeting-point of roads, one running north to the Balumbu country (outside the Fjort domain), another east to that of the Bateke (Nteke), who claim kinship with the Bavili. Mr. Dennett considers that this shows that the Fjort country extended north to the borders of the Bapindi, of whom the Balumbu formed a section, and east to the eastern limits of the Bateke—that is to say, north to about 3° 30′ S. and east to the Alima river. Further south he is inclined to place the limits of the old kingdom of Congo somewhere near Ambriz and at the Kasai. The central province of Loango—Buali—contains the town and sacred grove (Chibila) of the elected ruler or "Maloango." It is surrounded by three coast and three interior provinces, the latter adjoining the Mayombe country ("land of slaves"), inhabited by the Bakunu and Basundi,

both of whom own allegiance to the chief of Loango. Each of the six provinces is ruled by a chief, whose title is formed by the prefix "Ma" (=Mani Fumu, "son of a prince") placed before the name of the province. With the paramount chief, and with each of these minor chiefs, a ruler called Mambona (always a slave) is associated, who is in some ways on an equal footing with the first. Each province is divided into townships, each under a "Kongozovo." This subdivision is closely connected with the religious and social system of the people. Mr. Dennett endeavours, with the aid of the Abbé Proyart's map, to assign the limits of the separate provinces on the coast. He says that while the native kingdom to the south of the Congo has long been a prey to anarchy, and Kakongo and the Bateke country have shared the same fate, Loango alone has preserved its ancient form and traditions, owing, the people say, to the protection afforded by the Mayombe forests. It has, however, been unwisely broken up between the spheres of France and Portugal. On the coast of Loango, low-lying country alternates with hilly tracts, while towards the interior park-like undulating country gives place, as it rises gradually to the mountainous zone of Mayombe, to increasingly dense forest. The modern alluvium is traversed by bands of quartz, but this only contains traces of iron and copper, not gold, though this has been found in the conglomerate of the Kwilu. Iron (hæmatite) is the most plentiful mineral.

Lieut. Lemaire's New Expedition.—The intrepid leader of the Belgian Katanga expedition has undertaken a new series of researches in the Congo basin, and left Belgium at the end of July for Boma, with his assistants MM. Paulis and Weber. He intends to proceed to the extreme north-east corner of the Congo State by way of the Itimbiri and the Welle.

Wild Domestic Animals on São Thomé.—*Globus* quotes from the *Tropenpflanzer* (1902, No. 4) an account by A. F. Moller of various domestic animals which have now run wild on São Thomé. They include poultry, hogs (which at times even attack man), goats, dogs, and in the south of the island a few oxen. Almost all are extremely shy, and avoid the neighbourhood of villages, while their congeners, still in a state of domestication, often show a great inclination to run wild. The goats are found chiefly in the higher levels, especially on the Pico, from 4500 feet upwards. Tame doves, although they often mix with wild ones, do not become wild, nor do turkeys, but guinea-fowl do with great readiness.

AMERICA.

Mr. J. W. Tyrrell's Explorations between Great Slave Lake and Hudson Bay.—An important surveying expedition, carried out by Mr. J. W. Tyrrell in 1900 across the barren grounds of Northern Canada, is described in the Report of the Surveyor-General for 1900–1901 (Annual Report, Department of the Interior, Part iii.). The region in question was, in part, the site of the early journeys of Samuel Hearne and Sir George Back, but, since the date of the latter little had been done to extend our knowledge until 1893–94, when the unknown area was much reduced by the work of Messrs. J. B. and J. W. Tyrrell (*Journal* vol. vi. pp. 438 *et seq.*). A large area west of the Doobaunt river still, however, remained unknown, and it is this which has now been surveyed by Mr. J. W. Tyrrell, assisted by Mr. C. C. Fairchild. The outward route led from Edmonton, north to the Great Slave lake, over which a sledge journey of 250 miles was made on the ice. The eastern extremity of the lake was reached on May 9, and the real work of the expedition began. The most easterly bay, named by Mr. Tyrrell Charlton harbour, which is about 16 miles long, and is connected with McLeod bay by a deep channel less than a mile in width, was carefully surveyed, and an astronomical determination was made of the position of Pike's portage, the initial

point of the route survey. Old Fort Reliance, formerly Back's winter quarters, is now a complete ruin, though the surroundings form a beautiful natural park. During a survey of the Lockhart river, which enters Charlton harbour, the Parry falls, so enthusiastically described by Back, were visited, but, though beautiful, were found to be on a very much smaller scale than had been supposed by that traveller. The goods were meanwhile transported by the "Pike portage" route (which follows a chain of eight small lakes) to Artillery lake, the country becoming gradually less wooded, the most northerly grove being reached in 63° 4′ 10″ N., on the east shore of Artillery lake. Along the portage the country was composed of rocky hills of granite and dolomite. Artillery lake, which lies at an elevation of 1188 feet, or 668 above the Slave lake, has bold but desolate shores, and contains islands composed chiefly of dolomitic limestone with quartz. Its waters abound in particularly fine trout, and the Indians have a story that huge fish 20 to 30 feet long are found in it. Fur-bearing animals are also numerous, and the meat supply, furnished chiefly by the caribou, is abundant. From the lake an excursion was made eastward across the "height of land," which was found to lie only 7 miles off, at an elevation of 1188 feet, a new lake (Douglas) beyond it being drained to the north or east. The main route led north by the Kasba river and lake into Lake Clinton Colden, where the last ice met with in the outward journey was seen. The country was here much less broken and rugged, while the only trees seen were a few ground willows. From the south-east extremity of the last-named lake, the height of land was crossed by short portages, and a string of lakes was then followed to the Hanbury river. This runs through a wild and grand chasm (Dickson canyon), beginning with a fall of 50 feet, and below it a soft white sandstone formation was met with, the country assuming a more verdant appearance, affording luxuriant feeding-grounds for musk-oxen, while trees and flowering plants became more common. The Hanbury enters the Theron river, which had hitherto been known only from reports given to Back. It proved a large river, with a volume of 50,000 cubic feet per second at the junction, and its grassy or spruce-covered banks abounded with musk-oxen, caribou, etc. Mr. Tyrrell saw signs of ancient habitation, and believes that the valley was the site of the flourishing Indian settlement described by Hearne. On the Theron the party separated, Mr. Fairchild continuing the survey past the junction of the Doobaunt to the mouth of Chesterfield inlet, into which the river empties itself, while Mr. Tyrrell turned back towards its upper waters, hoping to make his way to Lake Athabasca. This proved impracticable, and, after visiting the upper Theron, Mr. Tyrrell made his way back by a more southerly route to Artillery lake, where the whole party once more united. On the way he had a most unpleasant experience, being overtaken by stormy weather, with deluges of rain and snow, while striking alone across the desolate barren grounds. Owing to the weather and the intricacies of the lake and river system, he was out sixteen days, though the distance in a direct line was only 80 miles. The Theron river—one of the finest in Canada—is navigable for river steamers 550 miles from Hudson bay, and its timber supply and herds of musk-oxen should be of considerable value, though the district is hardly a desirable one as regards agriculture. The report is accompanied by a large-scale map in twenty-two sections, and a number of excellent photographs.

Boundaries of United States Territorial Acquisitions.—The report of a conference upon the boundaries of successive acquisitions of territory by the United States was issued in July, 1901, as a census bulletin. The first map in the Statistical Atlas of the United States, based upon the results of the eleventh census, shows the boundaries of successive acquisitions of territory by the United States, but in a few particulars the map was found to differ from one published for the same

purpose by another Government Department, and the Director of the Census Office thought it advisable to appoint a committee to examine and harmonize these discrepancies. Finally, a conference for the purpose was arranged between the representatives respectively of the Department of State, of the Coast and Geodetic Survey, the Geological Survey, the Census Office, and the Library of Congress, whose final conclusions, it is satisfactory to learn, as clearly set forth in their report and accompanying map, were reached, with but one solitary exception, with entire unanimity. The boundaries which formed the subject of discussion were as follows: (1) The line separating the territory of the United States, prior to 1803, from the Louisiana Purchase, and stretching between the Mississippi and the Lake of the Woods; (2) the western boundary of the Louisiana Purchase; (3) the north-western boundary of Texas; (4) the southern boundary of the Mexican cession of 1848. Besides defining these boundaries, the conference came to the conclusion that the region between the Mississippi river and Lakes Maurepas and Pontchartrain to the west, and the Perdido river to the east, should not be assigned either to the Louisiana Purchase or to the Florida Purchase, but marked with a legend indicating that between 1803 and 1819 the title to it was in dispute.

Exploration in British Honduras.—We have received an advance copy of a newspaper article describing an expedition recently undertaken by Mr. T. Fenwick, merchant, of Belize, for the purpose of adding to our knowledge of the still little explored interior of the colony of British Honduras. The account is written in a popular style, and gives somewhat vague indications of the direction taken by the route; but it is claimed that districts never before visited by white men have been brought to light by the expedition. With six companions, Mr. Fenwick proceeded to the South Stann creek, and there hired a dorey, or native log-boat, with which the river was ascended to the Cockscomb mountains, amidst the difficulties incidental to the navigation of a tropical stream obstructed by fallen trees, which had to be cleared away by the machetes of the party. The course of the river is very tortuous, and camping on its banks was rendered most unpleasant by reason of the torrential downpours which occurred regularly each night. Two peaks of the Cockscomb mountains were ascended amid great difficulties, and the northern and southern sides of the range explored without a trace of inhabitants being discovered. The peaks were named respectively Joseph Chamberlain and Lady Wilson (after the wife of the governor), but their position relatively to those ascended and named by Governor Goldworthy's expedition (*Proc. R.G.S.*, 1889, p. 542) is not made clear. A west-by-south direction was next taken across a hitherto unknown tract, to which the name King Edward's Land was given, a range of mountains being reached which was found to be distinct from the Cockscombs. Still another range of "very considerable altitude" was found more to the south, running west and south, and extending in part into Guatemala. It was named Queen Alexandra's mountains. The return journey was effected amidst great hardships, provisions running short, so that the leader was only saved from starvation by the providential arrival of a relief party from Seven Hills. He speaks enthusiastically of the healthiness of the climate and the richness of the soil, and urges the suitability of the colony for settlement by small capitalists.

The National Geographic Society's Expedition to Martinique.—The first results of the expedition sent by the National Geographic Society of New York, under Messrs. Hill and Russell, to study the volcanic phenomena in the West Indies, have appeared in the July number of the *National Geographic Magazine*, which is wholly devoted to the subject. Besides accounts by the above-mentioned geologists on the phenomena observed by them on the spot, there are

reports by specialists on the volcanic rocks collected, and on the chemical analysis of the *ejectamenta*, as well as a collection of data on the range of the dust-falls. We hope to refer more fully to these reports in our next number.

The Historical Cartography of the Coasts of Guiana.—While the question of the boundary between French and Brazilian Guiana was still under dispute, a careful study of the historical and cartographical testimony respecting the river of Vincent Pinzon, on the identity of which the whole question turned, was undertaken by Prof. Vidal de la Blache, who has lately published the results of his inquiries under the auspices of the Université de Paris. Although the question has been removed from the sphere of practical politics by the recent award, which has fixed the boundary between the two territories on the coast at the mouth of the Oyapok, M. de la Blache's monograph is none the less of importance from the point of view of historical geography. The investigation has been made in a scholarly way, and the result is to throw a clear light on the development of the cartography and general knowledge of the Guiana coast from the sixteenth century onwards, the numerous reproductions of old maps being a valuable feature. The writer begins by examining the circumstances of the voyage of Pinzon along the Guiana coast, proceeding then to discuss the earliest maps in which the discoveries then made were recorded. These were of the Seville school, brought out under the auspices of a sub-department of the Casa de la Contratacion, and as Pinzon himself was associated with the work of this office, the maps (which belong to the first half of the sixteenth century) possess a special authority as regards his voyage. They all agree in placing the river Vincent Pinzon just beyond a cape situated a little distance north of the equator, and their influence may be clearly traced in other maps, such as those of Mercator and Philip Apianus, and the well-known map inserted by Hakluyt in his collection. On the Portuguese and French maps of the period the river of Vincent Pinzon rarely appears, but in its place is a Rio fresco or Rivière dolce, the former of which we learn from an official Portuguese document to be the name sometimes given in Portugal to the river of Vincent Pinzon. There is a "Rivière de Vincente" further north on some of these maps, but this, M. de la Blache holds, had no connection with Pinzon's river. With the voyages of the English and Dutch a new nomenclature appears on the maps, but Keymis's narrative and the maps based on it still connected Pinzon's name with a river occupying a similar position to that of Pinzon's river on the Spanish maps. The position of this river to the north of the most prominent cape of this part of the coast is explained by the undoubted fact that a branch of the Araguari formerly entered the sea to the north of the North cape. As regards the terminology employed in the Treaty of Utrecht, M. de la Blache shows that the word Japok, there once used as a synonym of Pinzon's river, was by a special usage of the French applied to a region quite distinct from that of the Oyapok, as is shown, *e.g.*, by Mocquet's narrative. The roots which form the word occur, in fact, at various points along the Guiana coast. The testimony of maps immediately after the date of the treaty is also adduced in support of the view that the river of Vincent Pinzon was the old northern branch of the Araguari.

The Degree Measurement in Ecuador.—An account of the operations carried out during the first season by the French expedition for the re-measurement of an arc of the meridian in Ecuador was lately communicated to the Paris Geographical Society by M. Bourgeois, head of the survey party, whose paper is printed in *La Géographie* (vol. v. p. 340). The mission reached Guayaquil in June of last year, and the difficult task then commenced of transporting the whole impedimenta of the expedition, weighing in all some ten tons, by the primitive

mule-paths which still form, for the greater part of the distance, the only means of communication between the coast and the elevated "Inter-Andine" region, in which the operations were to be carried on. Here the first place visited was Riobamba, where, during a stay of three months, the primary work of measuring a base-line and carrying out determinations of latitude, longitude, and azimuth was satisfactorily accomplished. The base-line chosen measured some 6 miles, and such was the precision with which the measurement was effected that the two separate results differed only by 7 mm., or a quarter of an inch. When this had been done, the expedition divided, one part continuing the triangulation in the neighbourhood of Riobamba, while the other measured a subsidiary base north of Quito, and determined the latitude of the northern extremity of the arc; the same being done for the southern extremity by an officer despatched for that purpose to Peru. During the stay at Tulcan, the northern station on the Columbian frontier, violent earthquake shocks were experienced, the whole region having been the scene of more than ordinary manifestations of volcanic activity during the last year. Eruptions both of Cotocachi, which had been regarded as extinct, and of Cumbal, in the Colombian territory, were observed. Although nominally Catholics, the Indians of the Inter-Andine region are very superstitious, and viewed the operations of the mission with great distrust, which they even manifested by acts of vandalism. During M. Bourgeois's absence the operations have been actively prosecuted under the direction of Captain Maurain.

AUSTRALASIA.

Dutch Expedition to the South Coast of New Guinea.—We learn from *Petermanns Mitteilungen* (1902, p. 119) that during a recent cruise along the southern coast of Dutch New Guinea for the purpose of inflicting punishment on native raiders, Assistant-Resident J. A. Kroesen visited the little-known portion of the coast on which Dr. Montague spent some time in captivity ten or more years ago. Some account of Dr. Montague's experiences was given in *Petermanns Mitteilungen* for 1892, but some doubt has since been cast on the accuracy of his statements. Mr. Kroesen's voyage has, however, in the main proved the correctness of Dr. Montague's account, both as regards the position of the villages and streams, and the conditions prevailing among the inhabitants.

POLAR REGIONS.

Return of the Baldwin Expedition.—This expedition has returned to Norway unsuccessful as regards an advance to the far north during the present year, but without having abandoned the hope of greater success on a second attempt. According to the details made public by Mr. Baldwin through Reuter's agency, the blocking of the Franz Josef Land channels by ice through the autumn of 1901 prevented the establishment of the intended depôts of provisions before the end of last year. This year three large depôts have been formed—one on Rudolf Land, near the headquarters of the Duke of the Abruzzi; a second in 81° 33′; and a third near the 81st parallel at Kane Lodge on the newly charted Greely island. The severe work told upon the sledges, while the food for the ponies and dogs, as well as the reserve supply of coal, had been depleted. Marine collections have been made, and photographs, including moving pictures of arctic life, taken. Nansen's hut was visited and sketched, and the record left by him secured.

The Plant Associations of the Arctic.—A very useful critical summary of publications on recent contributions to the ecology of the arctic regions is published in the *Vierteljahrsschrift der Naturforschenden Gesellschaft in Zurich*, 46, 1901, from the pen of M. Rikli. He points out that the term "tundra" is applied by geographers to the regions north of the temperate forest limit, but by botanists

to what Warming has termed the "fjeld" formation or association of plants, the most important and widely distributed on the geographical tundra, one also found in the higher mountain regions outside the polar circles. (1) This fjeld association of plants is characterized by dwarf xerophilic plants, of which mosses and lichens are the commonest. A few species, or even one, may be found predominating over considerable areas, but they do not completely cover the ground. This is also characteristic of the steppes, which are remarkable for great heat during the period of growth, whereas in the tundra excess of light is the most marked peculiarity of this period. Of the sub-associations we may distinguish (*a*) moss-fjeld, with species of (i.) polytrichum, or (ii.) dicranum predominating; and (*b*) the lichen-fjeld, with (i.) reindeer-moss (*Cladonia rangiferina*), (ii.) *Platysma-Cetraria*, (iii.) *Alectoria*, and (iv.) *Lecanora tartarea* prevailing as the conditions become more and more unfavourable. Lecanora is indifferent to rigorous climate or to the physical or chemical conditions of the ground, and hence is found at the plant limit, or forms the pioneer form on newly bared land. (*c*) The stony-fjeld is also a pioneer among the sub-associations, with mosses and a few rock-plants, such as saxifrages, curlew berry (*Empetrum*), *Papaver nudicaule*, etc. (*d*) The *Empetrum* sub-association is almost as hardy as the Lecanora one, and forms a transition to (2) the dwarf bush, which is rarely over 6 inches high, usually evergreen, with small compact leaves. *Empetra*, ericas, and vaccineas are the chief plants, but dwarf willows, birches (*Betula nana*), and in the south junipers (*Juniperus nana*) are found. (3) In the depressions are bog associations, which are of two groups, (*a*) grass, and (*b*) moss, according as one or the other type of plant predominates. (4) Locally some grassy meadows are found on the flood-plains in the larger valleys, and to these is due the name of Greenland. (5) On the gentle valley slopes facing the sun, the warm oases of the arctic, many species of perennial flowering plants are found; 40 to 60 species may be recognized on one patch, *i.e.* nearly one-tenth of the total arctic species. Very often these flowers may be found brightly colouring the slopes inside a fjord, around whose mouth, where fogs prevail, the snow still lies. (6) The littoral association is decidedly halophyllic, with succulent forms possessing long and much-branched roots or rhizomes. (7) Here and there, where human encampments or bird settlements have been formed, the accumulation of manure has favoured the growth of *Cochlearia* and arctic crucifers. Again, near the Greenland settlements, an adventitious flora is found of goose-grass, *Vicia Cracca*, *Stellaria media*, and other plants, due to the presence of man. (8) In the intermediate zone, between the fjeld-associations and the temperate forest, are pioneer woodlands of larch and birch. An instructive generalized section, illustrating the sequence of these associations and sub-associations, is appended to the article.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

A Sixteenth-century Map of the World on the Equidistant Polar Projection.—Mr. W. M. Voynich, in a supplement to his 'Exhibition Catalogue,' publishes the facsimile of a fragment of a manuscript map of the world, which he discovered in the original binding of a book printed in Italy in 1536. In an accompanying note Mr. E. G. Ravenstein discusses the age and character of the map, questions not readily determined, as the manuscript only includes parts of Europe, Eastern Asia, and Africa, and has moreover suffered greatly at the hands of the bookbinder. The fragment is part of a map of the world in two polar hemispheres, of a diameter of 356 mm. each. The outlines of the Mediterranean, of the Pontus, the Caspium Mare, the Mare Arabicum, and Sinus Persicus are taken from Ptolemy, but the nomenclature, although in Latin, is for the most part modern. Mr. Ravenstein suggests the author to have been a Spaniard, on the sole ground

that he refers to the King of Ethiopia as "Preste Ivan." Its age is the sixteenth century, for the dynasty of the Safi, which arose in 1502, is referred to as reigning in Persia, whilst the nomenclature along the coast of Africa and in the Persian gulf is derived from Portuguese charts, such as were in the hands of the illustrators of the Strassburg Ptolemy of 1513. The empty space between the two hemispheres is occupied by the following legend: "Vitoria—Haec est sola navis quæ ad his polum pvenit mense septenbri anno natali xpr. vi die 1522 que quidem omnem vincit antiquitatem si quidem e columnis erculeis p. fortun. . . ." The outlines of a ship are faintly visible. In fine, Mr. Ravenstein is of opinion that these polar hemispheres were drawn in Spain, and immediately after the return of the *Victoria*, and if this be so they are the earliest known example of the employment of the Equidistant Polar Projection, hitherto believed to have been introduced for the first time by Mercator in a small inset of his famous chart of 1569. Mercator's little map, however, includes little more than the arctic region. The first map of the world on this projection was published in 1581, and is by Guillaume Postel.

The Normal Profile of Streams.—In a paper,* read before the Institute of Engineers and Architects in Vienna, Baurath Richard Siedek develops the idea of a "natural standard profile" of running streams. The practical end in view is to lay down precise conditions for systems of regulation applicable to large rivers of slight slope, such as form the great inland highways of commerce. Employing the formulæ obtained for the rate of current in rivers and streams (see this *Journal*, November, 1901, and January, 1902), Siedek follows a method similar to that adopted by S. Finsterwalder in dealing with the theory of the movement of glacier ice; corresponding to Finsterwalder's conception of a "stationary glacier with steady stream." His discussion is based on a "natural standard" or "normal" stream (*natürlichen Ideal oder Normalgewässer*). The line of the current in a river is made up of a series of curves, produced by the complex forces determining its direction, but in the "normal" stream the river bed is supposed to consist of perfectly homogeneous plastic material, and the current flows directly down the slope, under the action of gravity, in a straight line. These conditions are realized when the forces producing curvature neutralize one another, *i.e.* at points of inflection, which are also points of least depth, or "fords." Since the velocity, and with it the erosive power, of a stream increases with the quantity of water, the transporting movement increases in the curved portions when the water rises; and since the mass of water, and consequently the velocity, is least at the "fords," the transported material is there deposited. With a falling stream, on the other hand, the velocity at the "fords" is greatest, because the water has the steepest relative fall, and the "fords" are deepened. This agrees with universal experience. At the so-called "good fords," where the water flows in a straight line, the erosive action of the stream at low water is the greatest in the river, and at such places the "normal" profile develops, as it were, automatically. Thus at low water the natural "normal profile" affords a measure of the navigability of a river, and also of its maximum capacity for deepening its own channel. It is, in fact, the fundamental fact in relation to regulation. The relation between surface width, mean depth, slope, and current velocity can be computed for the "normal profile" from data obtained at the beginning of a "good ford." Calculations made on the Danube and the Elbe show quite remarkable agreement; the profiles are always symmetrical bows, whose axes coincide with the direction of the current, and whose vertical height rarely exceeds 2 to 4 per cent. of the breadth.

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* Published in the *Zeitschrift des oesterreichischen Ingenieur- und Architekten-Vereins* 1902, No. 8.

Nieve Penitente.—An abstract of a paper on the "nieve penitente" of South America, lately contributed by Dr. R. Hauthal to a scientific periodical at Buenos Aires, is given in a recent number of *Globus* (1902, p. 308). The author considers that, however unlikely such a view may seem, the true "nieve penitente" (*Büsserschnee* in German) is limited to South America, none of the accounts of its occurrence in other parts of the world having to do, in his opinion, with an exactly similar phenomenon. After quoting Dr. Güssfeldt's description of "nieve penitente" as the best yet written, and supplementing it from his own observation, Dr. Hauthal points out that the peculiarity of the phenomenon consists in the strangeness and infinite variety of form of the individual figures, coupled with the regularity with which these are arranged in parallel rows, though never united into continuous ridges. The shapes are never cylindrical or those of pillars, nor even conical, but rather pyramidal, often elongated in section in the direction of the rows. It is incorrect to give the name "snow" to the phenomenon, though the ice is originally formed from snow which has been consolidated by melting and renewed freezing; and, unlike glacier-ice, the structure is never granular. There is, however, an alternation of layers of homogeneous transparent ice with others of whitish opaque ice containing air-balls. The "nieve penitente," which is found only on easterly mountain slopes between the heights of 11,500 and 16,500 feet, seems to owe its origin to the differential action of the sun's rays on ice-fields according to the angle of incidence.

OBITUARY.

Sir Edward Hertslet.

Our Society has lost an old and distinguished member in the person of Sir Edward Hertslet, who died from the effects of an operation on August 4, at the age of 78 years. Coming of a family which had long been associated with the Foreign Office, Sir Edward's whole career was likewise passed in its service, he having first obtained employment in the librarian's department so far back as 1840, while, after promotion to the post of sub-librarian in 1855, he succeeded his father as Librarian and Keeper of the Archives in 1857. During his long tenure of this important office he displayed great zeal in the study and utilization for the public service of the records committed to his charge, and to students of political geography he has been an especial benefactor by his indispensable collections of treaties referring to territorial boundaries both in Europe and Africa. In addition to these, he published a series of volumes dealing with the commercial treaties between this country and other nations, while a work of a more popular character appeared quite recently from his pen under the title 'Recollections of the old Foreign Office.' His 'Map of Europe by Treaty' and his 'Map of Africa by Treaty' are indispensable as works of reference. Sir Edward Hertslet's great knowledge of the history of diplomacy was requisitioned in his country's service in 1878, when he accompanied Lords Beaconsfield and Salisbury to the Berlin Congress in a special capacity; while in 1889 he served on the Commission appointed to regulate the boundary between the Dutch and British possessions in Borneo. He had been a Fellow of our Society since 1858.

Colonel C. R. Macgregor.

We regret to announce the death, which occurred in this country towards the end of last July, of Colonel C. R. Macgregor, C.B., D.S.O. Colonel Macgregor, who

was only 53 years of age, had seen much active service on the frontiers of our Indian Empire. Born on October 22, 1848, he entered the army early in 1868, and four years later was appointed to a post in the Indian Staff Corps. After taking part in several punitive expeditions against the wild tribesmen of the north-east frontier, he was allocated for duty under Lord (then Sir Frederick) Roberts, and took part in the march to Kandahar. Subsequently he again served on the north-east frontier, and passed through various campaigns, including the last Burma campaign. For the last two years he has been acting Brigadier-General on the North-Eastern Frontier District.

The numerous campaigns in which Colonel Macgregor took part led him into many countries of which our knowledge was very slight, and that he was not indifferent to the geographical side of his work is shown by the fact that he not only became a Fellow of the Royal Geographical Society in 1881, but in 1886, read a paper before the Society descriptive of a journey from Sadiya, on the upper waters of the Brahmaputra, to the Kampti Shan country, on the western branch of the Irawadi. This journey he performed in company with the late General Woodthorpe, R.E., who did so much to increase our knowledge of the geography of Central Asia. The travellers ascended the Noa Dihing valley to the Chaukan pass (8400 feet), over which they crossed into the country drained by the Irawadi. After reaching the villages of the Bor Kamptis on the Mili-Kha, the party returned by one of the tributaries of the Kyerug-dwen, and crossed back into Assam over the Patkoi range. The Kampti Shan country had been previously visited from Sadiya in 1826, by Lieuts. Wilcox and Burlton, but Woodthorpe and Macgregor obtained much interesting information, and their party carried out a useful survey. Those who enjoyed the personal acquaintance of Colonel Macgregor have the pleasantest recollections of their intercourse with him. With the natives his influence was great, and altogether our Indian Empire sustains a heavy loss by his death.

Mr. Alexander Michie.

By the death of Mr. Alexander Michie, which took place on August 8, the Society loses one of its oldest members. Mr. Michie was born at Earlsferry, Fifeshire, in 1833. Having entered upon a commercial career in the Far East, he rendered valuable services to Admiral Sir James Hope during the Tai-ping rebellion. In 1863 he returned to Europe by way of Siberia, and from that year dates his connection with the Society. He became a Fellow of the Society, and contributed to the old *Journal* a paper describing a journey from Tientsin to Mukden. The following year he published a full account of his journey home, which, in the then state of geographical knowledge, excited much interest. Returning to China, Mr. Michie became chairman of the Chamber of Commerce at Shanghai, and on behalf of that body he and Consul Swinhoe conducted a mission into Western China, which resulted in the collection of much valuable information, particularly as regards the province of Szu-chuan. In later years, Mr. Michie acted as correspondent for the *Times*. He settled down in this country in 1895, and the work which he subsequently gave to the world, under the title of 'An Englishman in China,' is valuable as containing the matured judgment on the modern relations between East and West of one who had lived in the Celestial Empire for over forty years.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By EDWARD HEAWOOD, M.A., *Librarian*, R.G.S.

The following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full:—

A. = Academy, Academie, Akademie.
Abh. = Abhandlungen.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Com. = Commerce.
C. Rd. = Comptes Rendus.
Erdk. = Erdkunde.
G. = Geography, Geographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
Iz. = Izvestiya.
J. = Journal.
k. u. k. = kaiserlich und königlich.
M. = Mitteilungen.
Mag. = Magazine.
Mem. = Memoirs, Mémoires.
Met. = Meteorological.
P. = Proceedings.
R. = Royal.
Rev. = Review, Revue.
S. = Society, Société, Selskab.
Sitzb. = Sitzungsbericht.
T. = Transactions.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.
Zap. = Zapiski.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

A selection of the works in this list will be noticed elsewhere in the "Journal."

EUROPE.

Austria—Lake of Gmunden. *M.K.K.G. Ges. Wien* **45** (1902): 55–83, 107–131. **Liburnau.**

Materialien zu einer Morphogenie der Schotterhügel und Terrassen am Nordende des Gmundener Sees. Eine Localstudie von Dr. J. R. Ritter Lorenz v. Liburnau.

Austria-Hungary. *Questions Dipl. et Colon.* **14** (1902): 69–89. **Jaray.**

Les nationalités en Autriche-Hongrie. Par Gabriel Louis Jaray. *With Map.*

Austria-Hungary—Galicia. *Vierteljahrs. G. Unterricht.* **1** (1902): 263–268. **Juritsch.**

Die polnische Tatra. Von Director Dr. Georg Juritsch.

Belgium—Population. *Mouvement G.* **19** (1902): 347–349. ———

La population de la Belgique.

France. *Vierteljahrs. G. Unterricht* **1** (1902): 193–203. **Müller.**

Ueber die Verwertung gewisser Gesetzmässigkeiten in der Umriss und der Bodengestalt europäischer Lander in der Chorographie. Von Prof. Dr. Johannes Müller. *With Map.*

France—Auvergne. *Rev. Scientifique* **18** (1902): 65–71. **Bruyant.**

Les Lacs d'Auvergne et l'Aquiculture. Par C. Bruyant.

France—Beaujolais. **Privat-Deschanel.**

Introduction à l'étude géographique du Beaujolais Tectonique et géologie. Par Paul Privat-Deschanel. (Mém. Soc. Fribourgeoise Sciences Naturelles. II. Fasc. 3. Géologie et Géographie.) *Maps and Diagrams.*

France—Canal. *B.S.G. Lille* **37** (1902): 335–359. **Palmié.**

Le canal des Deux Mers. Son intérêt au double point de vue économique et national, la possibilité de son exécution. Par M. Edmond Palmié. *With Illustrations.*

France—Marne. *C. Rd.* **134** (1902): 1455–1457. **Martel.**

Sur la rivière souterraine de Trépail (Marne). Note de M. E.-A. Martel.

France and Switzerland. *Rev. G.* **50** (1902): 441–445.

Les grandes lignes de circulation du Globe. Le percement de la Faucille. Par Ct. M.

On the project for the connection of the Simplon railway with French lines by a tunnel through the Jura.

Germany. *Abh. K.P.A.W., Berlin* (1901): 1–169. **Branco and Fraas.**

Das vulcanische Ries bei Nördlingen in seiner Bedeutung für Fragen der allgemeinen Geologie. Von H. H. W. Branco und Prof. Dr. E. Fraas. *With Map and Sections.*

The authors regard the morphological features of the Ries, which have puzzled so many observers, as the result of the formation of a laccolith, involving an extension of Gilbert's theory as to such phenomena. Their views have, however, been challenged (cf. *Journal*, vol. xviii. p. 321).

Germany. *Deutsch. Rundschau G.* **24** (1902): 348–358. **Bruhns.**

Ueber die vorgeschichtliche Bevölkerung auf deutschen Boden. Von Dr. B. Bruhns.

Germany—Baden. **Neumann.**

Land und Leute. Monographien zur Erdkunde, herausgegeben von A. Scobel, xiii. Der Schwarzwald. Von Prof. Dr. Ludwig Neumann. Bielefeld and Leipzig: Velhagen & Klasing, 1902. Size 10½ × 7, pp. 168. *Map and Illustrations. Price* 4*s.*

An attractive work, giving a clear account of the Black Forest both in its physical and human relations.

Germany—Canal. **Hermann.**

Internat. Engineering Congress, Glasgow, 1901. *P. Sect. II.* (1902): 2–23.

The Dortmund and Ems Canal. By Herr Regierungs- und Baurath-Hermann. *Diagram and Illustrations.*

Germany—Dunes. **Gerhardt.**

Handbuch des deutschen Dünenbaues. Im Auftrage des Kgl. Preuss. Ministeriums der öffentlichen Arbeiten und unter Mitwirkung von Dr. Johannes Abromeit, Paul Bock, Dr. Alfred Jentzsch, herausgegeben von Paul Gerhardt. Berlin: Paul Parey, 1900. Size 9 × 6, pp. xxviii. and 656. *Maps and Illustrations. Presented by Dr. A. Zimmermann.*

A very thorough piece of work, dealing principally with the methods employed in the many for fixing the dunes by planting, etc., but opening with a useful sketch of Gerphysical history and structure of dunes in general.

Germany—Prussia—Railways. **Collier.**

Prussian Railways. Foreign Office, Miscellaneous, No. 574, 1902. Size 9½ × 6, pp. 56. *Price* 3*d.*

Germany—Prussian Saxony. **Hellmann.**

Regenkarte der Provinz Sachsen und der Thüringischen Staaten, mit erläuterndem Text und Tabellen. In amtlichem Auftrage bearbeitet von Prof. Dr. G. Hellmann. Berlin: Dietrich Reimer (Ernst Vohsen), 1902. Size 10½ × 7, pp. 32. *Map.*

Germany—Thuringia. *Naturw. Wochenschrift* **1** (1902): 170–176, 433–440. **Scheibe.**

Geologische Spaziergänge im Thüringer Wald. Von Dr. R. Scheibe. *With profiles, etc.*

Germany—Trade. **Ward.**

Trade of Consular District of Hamburg for the year 1901. Foreign Office, Annual No. 2821, June, 1902. Size 9½ × 6, pp. 94. *Price* 5*d.*

Greece—Mineral Resources. **Bennett.**

Mineral Resources of Greece. Foreign Office, Miscellaneous, No. 576, 1902. Size 9½ × 6, pp. 24. *Maps. Price* 10½*d.*

The writer considers that the development of the mining industry of Greece, which has already made some progress, merits increased attention, and should supply a good opening for the employment of capital.

Greece and Crete. *C. Rd.* **134** (1902): 1157–1159. **Cayeux.**

Sur les rapports tectoniques entre la Grèce et la Crète occidentale. Note de M. L. Cayeux.

The author was one of the members of the French expedition to Crete in 1901 (cf. *Journal*, vol. xix. p. 212).

Hungary—Tatra. *Jahrb. Ungar. Karpathen-V.* **29** (1902): 53–114. **Dénes.**

Die Geologie des Tátragebirges. Auszug aus Prof. Dr. V. Uhlig's Werke. Von Prof. Franz Dénes. *With Profiles.*

Iceland. *G. Tidskrift* **16** (1901–1902): 155–173. **Bruun.**

Ved Vatna Jökulls Nordrand. Undersøgelser foretagne i Sommeren, 1901, paa Islands Østland. Af Kaptain Daniel Bruun. *With Map and Illustrations.*

Italy. **Nissen.**

Italische Landeskunde. Von Heinrich Nissen. Zweiter Band: Die Staedte. Erste Haelfte. Berlin: Weidmannsche Buchhandlung, 1902. Size 9 × 6, pp. iv. and 480. *Price 7s.*

The first volume of this work, which appeared as far back as 1883 (*Proc. R.G.S.*, 1884, p. 169), dealt with the physical features of Italy from the point of view of historical geography. The present instalment treats of the separate provinces in turn with reference to their inhabitants and the development of the towns and settlements, a historical standpoint being still maintained.

Lake of Geneva. *C. Rd.* **134** (1902): 1319–1321. **Yung.**

Des variations quantitatives du plankton dans le lac Léman. Note de M. Émile Yung.

Montenegro, etc. **Avelot and De la Nézière.**

H. Avelot et J. De la Nézière. Montenégro, Bosnie, Herzégovine. Paris: Henri Laurens, [not dated]. Size 10½ × 7½, pp. 248. *Illustrations. Presented by M. J. De la Nézière.*

Popular notes of travel, profusely illustrated by the author's sketches.

Norway—Lofoten Islands. *Alpine J.* **21** (1902): 90–102. **Collie.**

The Lofoten Islands. By J. Norman Collie. *With Illustrations.*

Rumania. *Rev. Française* **27** (1902): 211–223. **Paquier.**

La Roumanie économique: La question du pétrole. Par Léon Paquier. *With Map.*

Russia—Finland—Geodesy. *Fennia* **10**, No. 1 (1894–1901): 1–61. **Järnefelt.**

Astronomo-geodeettiset työt Suomessa vuosina 1865–1875. Kirjoittanut A. Järnefelt. Suomensi Otto Savander.

Sweden. ——

Svenska Turistföreningens Årsskrift för år 1902. Stockholm: Wahlström & Widstrand. *Illustrations.*

Contains descriptive articles by various writers.

weden—Gotland. *Tour du Monde* **8** (1902): 109–120. **Maury.**

L'ile de Gotland et les représentations théatrales de Visby. Par M. Lucien Maury. *With Illustrations.*

United Kingdom—Dorsetshire. *Geolog. Mag.* **9** (1902): 241–256 **Hudleston.**

Creechbarrow in Purbeck. By W. H. Hudleston, F.R.S. *With Illustrations.*

United Kingdom—Lake District. **Collingwood and others.**

The Lake Counties. By W. G. Collingwood. With special articles on birds, butterflies and moths, flora, geology, fox-hunting, mountaineering, yachting, angling, shooting, and cycling, by Miss Armitt, Canon Crewdson, Mr. Petty, Prof. Hull, etc. London: J. M. Dent & Co., 1902. Size 6½ × 4, pp. xii. and 392. *Maps and Illustrations. Price 4s. 6d. net. Presented by the Publishers.*

The object of this dainty little book differs from that of ordinary guide-books, which it will supplement without supplanting. In place of the usual, and in their way indispensable, practical directions to enable the tourist to find his way from place to place, it presents rather a series of pictures displaying the inner life, as it were, of the Lake country, and the associations and characteristics to which it owes its unique hold on the affections of its admirers. The author writes with the full sympathy with his subject which can alone give success in such a task, and the special articles treat concisely yet clearly of their several subjects.

United Kingdom—London. **Baedeker.**

London and its Environs. Handbook for Travellers. By Karl Baedeker. 13th Revised Edition. Leipsic: Karl Baedeker, 1902. Size 6½ × 4½, pp. x. and 450.

Maps and Plans. Price 6 *m.* 2 *copies, one presented by the Editor, the other by Messrs. Dulau & Co.*

United Kingdom—London. *G. Teacher* **1** (1902): 67–76. **Davies.**

The Geography of Greater London. By A. M. Davies, B.SC. *With Maps.*

United Kingdom—Mersey. **Nares.**

Report on the Present State of the Navigation of the River Mersey (1901), to the Right Honourable the Commissioners for the Conservancy of the River Mersey. By Vice-Admiral Sir G. S. Nares, K.C.B., F.R.S. London: Printed by Darling & Son, 1902. Size 10 × 6½, pp. 30. *Presented by the Mersey Conservancy.*

United Kingdom—Scotland—Clyde. **Alston.**

Internat. Engineering Congress, Glasgow, 1901. *P. Sect. II.* (1902): 98–123.

The River Clyde and Harbour of Glasgow. By W. M. Alston. *Map and Diagr.*

United Kingdom—Scotland—Edinburgh. **Geddes.**

Scottish G. Mag. **18** (1902): 302–312.

Edinburgh and its Region, Geographic and Historical. By Prof. Patrick Geddes.

United Kingdom—Trade. **Cox.**

The United Kingdom and its Trade. By Harold Cox. (Harper's International Commerce Series.) London: Harper Bros., 1902. Size 8 × 5½, pp. xvi. and 158. *Map. Price* 3*s.* 6*d.*

United Kingdom—Wales. **Baddeley and Ward.**

Thorough Guide Series. North Wales (Part i.) By M. J. B. Baddeley and C. S. Ward. Seventh Edition, Revised. London: Dulau & Co., 1902. Size 6½ × 4½, pp. xxiv. and 238. *Maps, Plans, and Panoramas. Price* 3*s. net. Presented by the Publisher.*

United Kingdom—Wales—Historical. **Little.**

Mediæval Wales. Chiefly in the twelfth and thirteenth centuries. Six Popular Lectures by A. G. Little. London: T. Fisher Unwin, 1902. Size 7½ × 5, pp. xii. and 148. *Maps and Plans. Presented by the Publisher.*

A series of popular lectures on some famous Welshmen (including Giraldus Cambrensis), and on the old Welsh castles and religious houses.

ASIA.

China. **Cordier.**

Histoire des relations de la Chine avec les puissances occidentales 1860–1902. [Vol. iii.] L'Empereur Kouang-Siu (Deuxième partie, 1888–1902). Par Henri Cordier. Paris: Félix Alcan, 1902. Size 9 × 5½, pp. 598. *Map. Price* 10*fr.*

The present volume completes the work, bringing the record of events down to the present time. The author fears that the lessons of the past few years will be quickly forgotten by the Chinese.

China—Marco Polo's Travels. *Iz. Imp. Russ. G. S.* **38** (1902): 1–46. **Veselovsk.**

Commentary by the archimandrite Palladius Kafaroff on the travels of Marco Polo in North China. N. T. Veselovsk. [In Russian.] *With Portrait.*

China—Newchwang. **Hosie.**

Trade of Newchwang for the year 1901. Foreign Office, Annual No. 2828, June, 1902. Size 9½ × 6, pp. 16. *Price* 1*d.*

Chinese Empire. *Iz. Imp. Russ. G.S.* **37** (1901): 355–483. **Potanin.**

Journey in the Central part of the Great Khingan in the Summer of 1899. By G. H. Potanin. [In Russian.] *With Map.*

Eastern Turkestan. *Globus* **81** (1902): 293–295, 320–323. **Winternitz.**

Dr. M. A. Steins Forschungen in Ostturkestan und deren wissenschaftliche Ergebnisse. Von Prof. Dr. M. Winternitz.

India—Bay of Bengal. ———

The Bay of Bengal Pilot, or Sailing Directions for the Coasts of Ceylon, India, and Siam, from Colombo to Junkseylon; the North-West Coast of Sumatra; and the Nicobar and Andaman Islands. Third Edition. London: Eyre & Spottiswood, 1901. Size 9½ × 6, pp. xxviii. and 508. *Chart. Price* 4*s.* 6*d. Presented by the Hydrographer, Admiralty.*

India—Trade. **Tozer.**

British India and its Trade. By H. J. Tozer. (Harper's International Commerce

Series.) London: Harper Bros., 1902. Size 8 × 5½, pp. xiv. and 90. *Map. Price 3s. 6d.*

Indian Ocean—Maldives and Laccadives. **Gardiner.**

The Fauna and Geography of the Maldive and Laccadive Archipelagoes. Being the Account of the Work carried on and of the Collections made by an Expedition during the years 1899 and 1900. Edited by J. Stanley Gardiner, M.A. Vol. i. Part ii. Cambridge: the University Press; London: C. J. Clay & Sons. 1902. Size 11½ × 9, pp. 119–222. *Charts and Illustrations. Price 15s. net.*

This part contains various zoological reports, together with the continuation of Mr. Gardiner's discussion of the coral formations of the Maldives and Laccadives and other parts of the Indian ocean.

Japan—Formosa. **Campbell.**

The Articles of Christian Instruction in Favorlang-Formosan, Dutch and English, from Vertrecht's Manuscript of 1650, with Psalmanazar's Dialogue between a Japanese and a Formosan and Happart's Favorlang Vocabulary. Edited by Rev. Wm. Campbell. London: Kegan Paul & Co., 1896. Size 9 × 7, pp. xx. and 200. *Presented by the Author.*

Japan—Formosa. *Z. Ges. Erdk. Berlin* (1902): 293–304. **Richthofen.**

Ueber eine Reise durch Formosa im Jahr 1900. Von W. Frhr. v. Richthofen. *With Illustrations.*

Malay Archipelago—Mentawei Islands. **Maas.**

Bei liebenswürdigen Wilden. Ein Beitrag zur Kenntnis der Mentawai-Insulaner, besonders der Eingeborenen von ši Oban auf Süd Pora oder tobo lagai. Nach Tagsbuch-Blättern von Alfred Maass. Berlin: W. Süsserott, 1902. Size 8½ × 6, pp. 256. *Maps and Illustrations. Price 7s. 6d.*

An account of the inhabitants of the little-known Mentawei group off the south-west coast of Sumatra, attention being paid both to their customs, industries, etc., and to their physical anthropology. A short account of the author's visit to the group was given in the *Journal* for 1898 (vol. xii. p. 410).

Northern Asia. *Zemlevedenie* (1902): 28–85. **Bielski.**

Northern Asia and its Geological Formations. By P. A. Bielski. [In Russian.] *With Maps.*

Pamir. *G. Tidskrift* **16** (1901–1902): 142–151. **Olufsen.**

Den anden danske Pamir expedition 1898-99. Rejse i Garan. Af O. Olufsen. *With Map and Illustrations.*

This concludes the series of articles which have appeared in the *Tidskrift* on Olufsen's second expedition.

Persia. *Iz. Imp. Russ. G.S.* **38** (1902): 47–108. **Rittikh.**

Journey in Persia and Persian Beluchistan in the year 1900. By P. A. Rittikh. [In Russian.] *With Maps.*

Persian Gulf. *J.S. Arts* **50** (1902): 634–652. **Bennett.**

The Past and Present Connection of England with the Persian Gulf. By T. J. Bennett.

Persian Gulf. **Kemball.**

Trade of the Persian Gulf for the year 1901. Foreign Office, Annual No. 2803, 1902. Size 9½ × 6, pp. 44. *Price 2½d.*

Philippine Islands. ——

Annual Reports of the War Department for the fiscal year ended June 30, 1901. Report of the Philippine Commission. 2 Parts (Part i. pp. 190), (Part ii. pp. 676). Public Laws and Resolutions passed by the Philippine Commission. (Pp. xviii. and 816.) Washington, 1901. Size 9 × 6. *Map and Plates.*

These volumes refer to a later period in the proceedings of the Commission than the report to the President of the United States previously noted in the *Journal*. Part i. is a general report on the work of the Commission and the present state of the Philippines, while Part ii. includes various reports on special subjects, *e.g.* one on Gutta-Percha and Rubber in the Malay Region.

Philippine Islands—Samar. *Ann. Hydrographie* **30** (1902): 120–126. ——

Die Insel Samar.

Russia—Baku. **Chambers.**

The Russian Petroleum Trade. Production of Crude Oil of the Baku Fields. (Consular Reports, June, 1902, vol. lxix. 175–216.) *Map.*

Russia—Caucasus. **Radde.**

Die Sammlungen des Kaukasischen Museums, im Vereine mit Special-Gelehrten bearbeitet, und herausgegeben von Dr. Gustav Radde. Band iii. Geologie. Von Prof. N. I. Lebedew. Tiflis, 1901. Size 12½ × 9, pp. 322. *Map and Plates. Presented by Dr. G. Radde.*

Russia—Siberia. *Petermanns M.* **48** (1902): 78–83. **Sibiriakow.**

Der Weg von Jakutsk zum Ochotskischen Meer. Ajan, ein Seehafen für das Gebiet Jakutsk. Von Alex. Sibiriakow. *With Map.*

Russia—Siberia. **Meakin.**

A Ribbon of Iron. By Annette M. B. Meakin. Westminster: A. Constable & Co., 1901. Size 8 × 5, pp. 320. *Map and Illustrations. Presented by the Publisher.*

Account of a journey by two English ladies across Siberia in 1900.

Russian Central Asia. **Lipsky.**

Upper Bukhara, Results of three years' travels in Central Asia in 1896, 1897, and 1899. V. I. Lipsky. Part i. [In Russian.] St. Petersburg, 1902. Size 11⅞ × 9, pp. 318. *Illustrations.*

Sea of Aral. *Iz. Imp. Russ. G.S.* **38** (1902): 109–120. **Berg.**

Hydrological Explorations in the Sea of Aral in the summer of 1901. By L. Berg. [In Russian.]

Turkestan. **Schwarz.**

Turkestan, die Wiege der indogermanischen Völker. Nach funfzehnjährigem Aufenthalt in Turkestan dargestellt von Franz v. Schwarz. Freiburg: B. Herder, 1900. Size 9½ × 6½, pp. xx. and 606. *Map and Illustrations. Price* 13*m. Presented by the Publisher.*

The author, who has lived fifteen years in Turkestan, and was formerly astronomer at the Tashkent Observatory and Director of the Turkestan Meteorological Institute, gives in this work a valuable account of the people of that country, their origin, manners, and customs, industries, trade and agriculture, etc. The concluding section is devoted to the climate, and the book contains a small map and an excellent index.

Turkey—Mitilini. *B.S.R.G. d'Anvers* **26** (1902): 49–84. **Hauttecœur.**

L'île de Mytilini. Par M. H. Hauttecœur.

Turkey—Palestine and Syria. *Globus* **81** (1902): 309–314. **Nehring.**

Die geographische Verbreitung der Säugetiere in Palästina und Syrien. Von Prof. Dr. A. Nehring. *With Map.*

AFRICA.

Abyssinia. *B.S.G. Italiana* **3** (1902): 539–544. **Erlanger.**

Sulla spedizione e relativo soggiorno in Abissinia e nei paesi dei Galla e dei Somali. Relazione del barone carlo von Erlanger. *With Map and Illustration.*

See note in the Monthly Record.

Abyssinia. *Beiträge Kolonialpolitik* **3** (1901–1902): 610–615. **Hermann.**

Abessiniens Grenzen. Von Dr. Rudolf A. Hermann.

Africa. *P.R.I.* **16** (1902): 532–546. **Gibbons.**

Through the Heart of Africa from South to North. By Major Alfred St. Hill Gibbons.

Africa—Cartography. *Die Natur* **51** (1902): 16–17, 28–29, 68–69. **Behrens.**

Kartenaufnahmen in Afrika. Von Heinrich Behrens.

Angola. *Scottish G. Mag.* **18** (1902): 358–369. **Lewis.**

Life and Travel among the People of the Congo. By Rev. Thomas Lewis.

British East Africa. *J.S. Arts* **50** (1902): 684–690. **Betton.**

Prospective Railway Developments in British Equatorial Africa. By C. Steuart Betton. *With Map.*

On the advisability of constructing a railway from Entebbe, in Uganda, down the Nile valley to Gondokoro.

British East Africa. **Lyne.**

Agricultural Prospects of the Plateaux of the Uganda Railway. Foreign Office, Miscellaneous, No. 577, 1902. Size 9½ × 6½, pp. 12. *Price* 1*d.*

This is noticed in the Monthly Record.

Cape Colony. **Gilchrist.**

Cape of Good Hope. Department of Agriculture. Marine Investigations in South Africa. Observations on the Temperature and Salinity of the Sea around the Cape Peninsula. By J. D. F. Gilchrist. Cape Town, 1902. Size 9½ × 6½, pp. 181–216. *Diagrams. Presented by the Author.*

This will be specially noticed.

Cape Colony. ——

Report of His Majesty's Astronomer at the Cape of Good Hope to the Secretary of the Admiralty for the year 1901. London, 1902. Size 12 × 10, pp. 22.

This will be noticed in the Monthly Record.

Cape Colony—Saldanha Bay. **Stevens.**

Saldanha Bay and its Development. By D. C. Stevens. (Cutting from the *Cape Argus Weekly Edition*, November 13, 1901.)

Central Africa. *B.S. d'Études Colon.* **9** (1902): 277–301. **Hecq.**

Les grands lacs africains et le Manyema. Par C. Hecq. *With Illustrations.*

On a journey from the mouth of the Zambezi to Lake Kivu and Manyema.

Central Africa—Nyasa-Tanganyika Boundary.

Treaty Series. No. 8, 1902. Agreement between the United Kingdom and Germany relative to the Boundary of the British and German Spheres of Interest between Lakes Nyasa and Tanganyika. Signed at Berlin, February 23, 1901. London: Eyre and Spottiswoode, 1902. Size 9½ × 6, pp. 6. *Map. Price* 6½*d.*

This agreement ratified the recommendations of the Anglo-German boundary commission with regard to the boundary-line, which have already been alluded to in the *Journal* (vol. xviii. p. 430).

Congo. *T. and 10th Rep. Liverpool G.S.* (1901): 23–29. **Lemaire.**

The Sources of the Congo. By Captain Charles Lemaire. *With Map.*

Discusses the question as to the branch which ought to be considered the headstream of the Congo. The author considers Delcommune's statement that the Luapula brings down more water than the Lualaba to be based on insufficient evidence.

Congo State. *Mouvement G.* **19** (1902): 295–296. ——

La population des rives du Congo (Lualaba) entre Ponthierville (en amont des Stanley-Falls) et Kasingi (en aval des chutes de Hinde).

Egyptian Sudan. *Naturw. Wochenschrift* **1** (1902): 373–378. **Linck.**

Die Hochebene Kordofans, ein Zug im Antlitz der Erde. Von G. Linck. *With Map and Illustrations.*

Egyptian Sudan—Railways. **Macauley.**

Internat. Engineering Congress, Glasgow, 1901. *P. Sect. I. Railways* (1902) 33–45.

The Sudan Government Military Railways. By Major C. B. Macauley. *With Map.*

Fernando Po. *Kolon. Z.* **3** (1902): 139–140. ——

Fernando Poo. *With Map.*

French Congo. *B.S.G. Marseille* **25** (1901): 242–266. **Léotard.**

Sur la route de Fachoda. De l'Atlantique au Bahr-el-Ghazal en cinq mois. L'Enseigne de Vaisseau André Perrot. Par M. Jacques Léotard.

On the journey of a young naval officer who was assassinated in the Bahr-el-Ghazal in 1899 while on his way from the Congo towards Fashoda.

French Congo. *B.S.G. Lyon* **17** (1902): 734–740. **Trilles.**

Mille lieues dans l'Inconnu (De la Côte de Guinée aux Rives de la Sangha, à travers le Pays Pfang). Par le R. P. Trilles.

The author accompanied M. Lesieur in his expedition across the northern part of French Congo (*Journal*, vol. xviii. p. 535).

French West Africa. **Gentil.**

Emile Gentil. La chute de l'Empire de Rabah. Paris: Hachette et Cie., 1902. Size 10 × 6½, pp. 308. *Map and Illustrations. Presented by the Publishers.*

This will be specially reviewed.

French West Africa. *Rev. Française* **27** (1902): 193–207. **Montell.**

L'organisation du Bas Chari. La colonne Destenave et la mort de Fad el Allah. Par A. Montell. *With Map.*

German Colonies—River-navigation. *B.S. d'Études Colon.* **9** (1902): 353–359. ——

La navigabilité des Cours d'eau dans les Colonies Allemandes d'Afrique.

German East Africa. *Sitz. A.W. Berlin* (1902): 215–236. **Engler.**

Ueber die Vegetationsverhältnisse des im Norden des Nyassa-Sees gelegenen Gebirgslands. Ergebniss der Nyassasee- und Kingagebirgs-Expedition der Hermann und Elise geb. Heckmann Wentzel-Stiftung. Von A. Engler.

This is noticed at p. 338, *ante*.

German East Africa. **Merker.**

Rechtsverhältnisse und Sitten der Wadschagga. Von M. Merker. (*Dr. A. Petermanns Mitteilungen*, Ergänzungsheft Nr. 138.) Gotha: Justus Perthes, 1902. Size 11 × 7½, pp. 42. *Illustrations. Price* 4*m.*

German South-West Africa. *Z. Ges. Erdk. Berlin* (1902): 215–230. **Hartmann.**

Das Ambo-Land auf Grund seiner letzten Reise im Jahr 1901. Von Dr. Georg Hartmann. *With Map and Illustrations.*

Kamerun. *Petermanns M.* **48** (1902): 73–78. **Langhans.**

Vergessene Reisen in Kamerun. I.—Reisen des Missionars Alexander Ross von Alt-Kalabar nach Efut 1877 und 1878. Von Paul Langhans. *With Map.*

Liberia—Frontier. *Rev. G.* **50** (1902): 517–520. ——

La frontière franco-libérienne. Par A. N. *With Maps.*

Madagascar. **Brandstetter.**

Malayo-Polynesische Forschungen von Prof. Dr. Renward Brandstetter. Zweite Reihe. II.—Tagalen und Madagassen. Eine sprachvergleichende Darstellung als Orientierung für Ethnographen und Sprachforscher. Luzern: J. Eisenring, 1902. Size 9 × 6½, pp. 86.

A detailed comparison of the Tagal Language of the Philippines with Malagasy.

Madagascar. *B.S.G. Marseille* **25** (1901): 229–241. **Carré.**

Les Ports de la Côte ouest de Madagascar. Par M. Pierre Carré.

Madagascar. *C. Rd.* **134** (1902): 958–961. **Colin.**

Travaux géographiques autour du massif Central de Madagascar. Par le P. Colin. *With Plan.*

On a survey by theodolite and astronomical observations.

Madagascar. *C. Rd.* **134** (1902): 1274–1278. **Colin.**

Travaux magnétiques autour du massif Central de Madagascar. Note du P. Colin. *With Diagram.*

Madagascar. *Rev. Maritime* **153** (1902): 1017–1036. **Fichot.**

Les côtes de Madagascar. Par E. Fichot. *With Map.*

Madagascar. *Rev. G.* **50** (1902): 424–440. ——

L'œuvre du général Galliéni à Madagascar. Par Capitaine P——.

Madagascar—Language. *Rev. Scientifique* **17** (1902): 801–807. **Mager.**

Les origines de la langue malgache. Par M. Henri Mager.

Morocco. **Canal.**

Géographie Générale du Maroc. Par Joseph Canal. Paris: A. Challamel, 1902. Size 12½ × 8½, pp. xiv. and 188. *Maps. Price* 6*s.*

This monograph received the prize lately offered by the Oran Geographical Society for a general geography of Morocco. It gives a clear outline of the geography (physical, political, and economic) based on the works of the principal travellers, and will be useful as bringing together a mass of scattered information on a country which must more and more attract the attention of Europe.

Morocco. *B.S.G. Marseille* **25** (1901): 411–416. **Delbrel.**

Le Maroc actuel et la Cour Chérifienne. Par M. G. Delbrel.

Morocco. *La G., B.S.G. Paris* **5** (1902): 321–339. **Weisgerber.**

Explorations au Maroc: I. L'Oum Er-Rebia; II. Les thermes des environs de Fas. Par Dr. F. Weisgerber. *With Maps and Illustrations.*

Dr. Weisgerber's explorations have already been referred to in the *Journal* (vol. xix. pp. 88).

Natal. *J.R. Colonial I.* **33** (1902): 145–168. **McMaster.**

The High Plateaus of Natal, their Climate and Resources. By Emile McMaster, B.A.

Niger. *Renseignements Colon., Comité l'Afrique Française* No. 4 (1902): 73–79. **Lenfant.**

La navigabilité du Niger: rapport du Capitaine Lenfant. *With Maps and Portrait.*

North-East Africa. *Scottish G. Mag.* **18** (1902): 281–302. **Austin.**

Through the Sudan to Mombasa *viâ* Lake Rudolf. By Major Austin, C.M.G. *With Map.*

Rhodesia. *Rev. G.* **50** (1902): 340–348. **Maitre.**

Pénétration de la "North-Eastern Rhodesia," par les missionnaires français. Par Henri Maitre.

A sketch of the work of the "White Fathers" in North-Eastern Rhodesia, the geographical results of which are summarized in the present number of the *Journal.*

Sahara. *Rev. Française* **27** (1902): 278–288. **Demanche.**

La France et le Maroc à Figuig. Par G. Demanche. *With Map.*

Sahara. *La G., B.S.G. Paris* **5** (1902): 5–20, 175–195. **Bruhnes.**

Les Oasis du Souf et du M'zab comme types d'établissements humains. Par Jean Bruhnes. *With Map and Illustrations.*

South Africa—Geodetic Survey. **Gill.**

Cape of Good Hope. Geodetic Survey of South Africa. Vol. ii. Report on a Rediscussion of Bailey's and Fourcade's Surveys and their Reduction to the System of the Geodetic Survey. By Sir David Gill, K.C.B. Cape Town, 1901. Size 13 × 8, pp. xx. and 258. *Chart.*

Tripoli. *Rev. G.* **50** (1902): 281–293. **Dornin.**

La question de la Tripolitaine. Par Pierre Dornin. *With Map.*

Uganda Protectorate. **Johnston.**

The Uganda Protectorate. An Attempt to give some description of the Physical Geography, Botany, Zoology, Anthropology, Languages, and History of the Territories under British Protection in East Central Africa, between the Congo Free State and the Rift-Valley, and between the 1st degree of S. Latitude and the 5th degree of N. Latitude. By Sir Harry Johnston. In two vols. London: Hutchinson & Co., 1902. Size 10 × 7, pp. xx. and 1018. *Maps, Plates, and Illustrations. Price 42s. net. Presented by the Publishers at Author's request.*

This is reviewed in the present number.

Wadai. *Rev. G.* **50** (1902): 258–268. ———

Notes sur le Ouadaï.

Based on communications from Captain Robillot, one of the French officers entrusted with the pacification of the Shari region.

West Africa. *J. African S.* (1902): 288–301. **Jackson.**

The Vegetable Resources of West Africa. By John R. Jackson.

West Africa—Railways. *J. African S.* (1902): 339–354. **Shelford.**

On West African Railways. By Fred Shelford, B.SC. *With Illustrations.*

NORTH AMERICA.

America—Railway. ———

Monthly B. Internat. Bureau American Republics **12** (1902): 1131–1148.

The Intercontinental Railway. *With Map.*

Report of the Committee to the Pan-American Congress of last year (cf. *Journal*, vol. xvii. p. 77).

Canada. ———

Annual Report of the Department of the Interior for the year 1900–1901. Ottawa,

1901. Size 10 × 6½, pp. xii., xlviii., 329, 29, 8, 8, 6, 39, and 16. *Maps and Illustrations.*

Includes Reports on Immigration, Forestry, etc., as well as a number of important reports on recent surveys (cf. *ante*, p. 340).

Canada. ———

Third Annual Report of the Geographic Board of Canada, 1901. (Supplement to the Thirty-Fourth Annual Report of the Department of Marine and Fisheries.) Ottawa, 1902. Size 10 × 6½, pp. 44.

Mainly a reprint of the last report (*Journal*, vol. xviii. p. 333).

Canada. **Baillairgé.**

Memoranda. Canada from the Atlantic to the Pacific and Arctic Oceans, Arctic Voyages, Voyages of Discovery in the North, and Public Works, etc., etc. By G. F. Baillairgé, Deputy Minister of Public Works. Size 10 × 6½, pp. 272. *Presented by the Author.*

Contains a considerable amount of miscellaneous information on Canadian geography and history.

Canada—Athabasca River. *Appalachia* **10** (1902): 28–43. **Habel.**

At the Western Sources of the Athabasca River. By Jean Habel. *With Plates.*

Canada—British Columbia. ———

Recent Gold Discoveries on Horsefly River, Cariboo District, B.C. Victoria, B.C., 1901. Size 11 × 7½, pp. 8. *Map.*

Canada—Geological Survey. ———

Summary Report of the Geological Survey Department for the Calendar Year 1901. Ottawa, 1902. Size 10 × 6½, pp. 270. *Plates.*

Canada—Mt. Assiniboine. *Alpine J.* **21** (1902): 102–114. **Outram.**

The First Ascent of Mount Assiniboine. By Rev. James Outram. *With Illustrations.*

Canada—Mt. Assiniboine. *Appalachia* **10** (1902): 43–50. **Outram.**

Our Dash for Mt. Assiniboine. By James Outram. *With Plates.*

On the first ascent of Mt. Assiniboine in September, 1901.

Canada—Rocky Mountains. *Appalachia* **10** (1902): 1–19. **Outram.**

The Ottertail Group, Canadian Rockies. By James Outram. *With Plates.*

Mexico. *B.S.R.G. d'Anvers* **26** (1902): 87–138. **George.**

La Terre chaude Mexicaine, suite à la causerie intitulée: Une excursion à travers le Mexique. Par M. Louis George. *With Illustrations.*

North America—History. **Charlevoix, Shea, and Morrison.**

History and General Description of New France. By Rev. R. F. X. de Charlevoix. Translated from the Original Edition and Edited with Notes by Dr. John Gilmary Shea. With a Memoir and Bibliography of the Translator by Noah Farnham Morrison. 6 volumes. London: Francis Edwards, 1902. Size 10 × 8, pp. (vol. i.) xiv. and 286; (vol. ii.) ix. and 284; (vol. iii.) vi. and 312; (vol. iv.) viii. and 308; (vol. v.) x. and 312; (vol. vi.) x. and 256. *Maps, Plans, and Portraits. Presented by the Publisher.*

This is reviewed in the present number.

United States—Alabama. **Martin.**

Internal Improvements in Alabama. By William Elejius Martin. (Johns-Hopkins University Studies in Historical and Political Science, Series XX. No. 4.) Baltimore: Johns-Hopkins Press. April, 1902. Size 9½ × 6, pp. 88.

On the development of roads, railways, harbours, etc.

United States—California. *Science* **15** (1902): 951–954. **Hershey.**

A supposed early Tertiary Peneplain in the Klamath Region, California. By Oscar H. Hershey.

United States—California. **Manson.**

A brief history of Road Conditions and Legislation in California. By Marsden Manson. (Reprinted from *Proceedings*, Am. Soc. Civil Engineers, February, 1902.) Size 9 × 6, pp. 72–98. *Maps.*

Outlines the progress of the movement inaugurated in 1895 for improving the road-system of California.

United States—Climate. *Monthly Weather Rev.* **30** (1902): 19–28, 69–79. **Matthews.**

The term Indian Summer. By Albert Matthews.

This will be the subject of a note.

United States—Idaho. **Russell.**

Geology and Water Resources of Nez Perce County, Idaho. By I. C. Russell. Parts i. and ii. (Department of the Interior, Water-Supply and Irrigation Papers of the United States Geological Survey, Nos. 53 and 54.) Washington, 1901. Size 9 × 6, pp. 142. *Maps and Illustrations.*

A very thorough study of the geology and physical geography (Part i.), and of the water-supply and other economic features (Part ii.) of the area dealt with. The illustrations are a valuable aid to a knowledge of the nature of the country.

United States—Kansas. *B. American G.S.* **34** (1902): 89–104. **Adams.**

Physiographic Divisions of Kansas. By George I. Adams. *With Maps.*

United States—Trade. **Nelson.**

The United States and Its Trade. By Henry Loomis Nelson. (Harper's International Commerce Series.) London: Harper Bros., 1902. Size 8 × 5¼, pp. xvii. and 132. *Map. Price* 3*s.* 6*d.*

CENTRAL AND SOUTH AMERICA.

Argentina. *S. and 10th Rep. Liverpool G.S.* (1901): 30–46. **Moreno.**

Scenery of Argentina. By Dr. Francisco P. Moreno.

Brazil. *Petermanns M.* **48** (1902): 92–95. **Huber.**

Zur Entstehungsgeschichte der brasilischen Campos. Von Dr. J. Huber.

Brazilian Guiana. *Rev. G.* **50** (1902): 269–272. **Mathis.**

Les régions de Cachipour, de Counani et de Carsewenne. (Contribution à la géographie des Guyanes.) Par Dr. Constant Mathis.

Brazil and British Guiana. ———

Monthly B. Internat. Bureau American Republics **12** (1902): 1148–1151.

Arbitration Agreement between Brazil and Great Britain. Arbitration Treaty to determine the Limits between Brazil and British Guiana, concluded in London, November 6, 1901, and proclaimed January 28, 1902.

Text of the agreement submitting the settlement of the boundary between the sources of the Takutu and Rupununi to the decision of the King of Italy.

Central America—Canal. *B. American G S.* **34** (1902): 132–138. **Davis.**

The Isthmian Canal. By Arthur P. Davis. *With Profile and Sketch-map.*

Central America—Panama Canal Route. **Heilprin.**

A Defense of the Panama route. By Prof. Angelo Heilprin. Philadelphia: the Franklin Press, 1902. Size 10 × 6½, pp. 12.

The author considers that the Panama route is the true commercial route between the two oceans, and that it presents equal advantages from a constructional point of view.

Chile-Argentine Boundary. **Moulin.**

Le litige Chilo-Argentin et la délimitation politique des frontières naturelles. Par Henri-Alexis Moulin. Paris: Arthur Rousseau, 1902. Size 9 × 5¼, pp. 148. *Maps. Presented by the Publisher.*

On the principles involved in the Chilean-Argentine boundary question, and in the demarcation of a natural frontier in general.

Chile and Argentine Republic. ———

Statement presented on behalf of Chile in reply to the Argentine Report, submitted to the Tribunal constituted by H.B. Majesty's Government acting as Arbitrator in pursuance of the Agreement dated April 17, 1896. 4 vols. Also Appendix to same, 2 vols., and case of Maps. London, 1901–2. Size 10 × 7½, pp. xlvi. and 1664; Appendix pp. 948. *Maps and Plates. Presented by the Chilean Legation in London.*

No pains have evidently been spared in the preparation of this statement, which contains a vast amount of important geographical information in the form of descriptions, maps, and illustrations. It forms a virtual compendium of the results of recent exploration from the Chilean side in the Patagonian Andes.

Cuba. *B. American G.S.* **34** (1902): 105–116. **Vaughan and Spencer.**
The Geography of Cuba. By T. Wayland Vaughan and Arthur C. Spencer.

Danish West Indies—Bibliography. **Griffin.**
A List of Books (with references to Periodicals) on the Danish West Indies. By A. P. C. Griffin. (Library of Congress, Division of Bibliography.) Washington, 1901. Size 10½ × 7¼, pp. 18.

Ecuador. *La G., B.S.G. Paris* **5** (1902): 340–350. **Bourgeois.**
Opérations de la mission française chargée de la mesure d'un arc de méridien en Équateur. Par R. Bourgeois.

Guatemala. **Maudslay.**
Biologia Centrali-Americana. Edited by F. Ducane Godman. Archæology. By A. P. Maudslay. Part xv. Text (vol. iii., pp. 43–50) and Plates. April, 1902. London: R. H. Porter. Size (Text) 13½ × 10½; (Plates) 13 × 20½.

This instalment deals with the archæological remains at Tikal, which are illustrated by the same superb reproductions of photographs that have accompanied former parts.

Guatemala. *Nature* **66** (1902): 150. **Rockstroh.**
Earthquake in Guatemala. By Edwin Rockstroh. *With Map.*

Peru. *B.S.G. Lima* **11** (1901): 62–113. **Samudio.**
El caucho y la shiringa. Por el doctor Manuel Patiño Samudio. *With Map.*

On the possible development of the Eastern provinces of Peru by the encouragement of immigration and the opening of navigation on the rivers, etc.

Santo Domingo. *P.A. Nat. Sci. Philadelphia* **53** (1901): 554–561. **Harshberger.**
An Ecological Sketch of the Flora of Santo Domingo. By John W. Harshberger, PH.D. *With Plates.*

Tierra del Fuego. **Rabot.**
Charles Rabot. La Terre de Feu d'après le Dr. Otto Nordenskjöld. Paris: Hachette & Co., 1902. Size 7½ × 5, pp. iv. and 212. *Map and Illustrations. Price 4 fr. Presented by the Author.*

Dr. Nordenskjöld's account of his journey having been brought out in Swedish, M. Rabot has done good service by making it more generally accessible through a French version.

West Indies. *Nature* **66** (1902): 56–58, 107–112, 151–153. **Milne.**
The recent Volcanic Eruptions in the West Indies. By Prof. J. Milne, F.R.S.

West Indies. *Rev. Scientifique* **17** (1902): 769–775. **Velain.**
Le cataclysme volcanique des Antilles. Par Ch. Vélain. *With Illustrations.*

West Indies—Martinique. *Questions Dipl. et Colon.* **13** (1902): 676–685. **De la Peyre.**
La catastrophe de la Martinique. Aperçus économiques. Par Jean de la Peyre. *With Maps.*

West Indies—Martinique. *C. Rd.* **134** (1902): 1246–1248, 1369–1371. **Lacroix.**
Les roches volcaniques de la Martinique. Note de M. A. Lacroix.

West Indies—Martinique. *C. Rd.* **134** (1902): 1327–1329. **Lacroix.**
Sur les cendres des éruptions de la Montagne Pelée de 1851 et de 1902. Note de M. A. Lacroix.

West Indies—St. Vincent. *Mission Field* **47** (1902): 241–244. ——
The Disasters of St. Vincent. *With Map and Illustrations.*

AUSTRALASIA AND PACIFIC ISLANDS.

Australia. *Deutsch. G. Blätter* **25** (1902): 1–49, 105–155. **Wiedemann.**
Beobachtungen über den Handel und Verkehr Australiens; gesammelt während einer wirtschaftsgeographischen Studienreise 1900–1901. Von Dr. Max Wiedemann.

Australian Commonwealth. ——
Commonwealth of Australia Constitution Bill. Reprint of the Debates in Parliament, the Official Correspondence with the Australian Delegates, and other papers. London: Wyman & Sons, 1900. Size 10 × 6½, pp. v. and 200. *Presented by the Secretary of State for the Colonies.*

British Solomon Islands. ——

British Solomon Islands. Report for 1900–1901. Colonial Reports, Annual. No. 347, 1902. Size 9½ × 6, pp. 20. *Price* 1½*d.*

Chatham Islands. **Dendy.**

Mem. and P. Manchester Lit. and Philosoph. S. **46** (1902): No. 12, 1–29.

The Chatham Islands: a Study in Biology. By Arthur Dendy, D.SC.

Marianne Islands. *M. Deutsch. Schutzgeb.* **15** (1902): 96–118. **Fritz.**

Reise nach den nördlichen Marianen. Von Bezirksamtmann Fritz. *With Illustrations.*

This will be noticed in the Monthly Record.

New South Wales. ——

1901. Legislative Assembly, New South Wales. Annual Report of the Department of Mines, New South Wales, for the Year 1900. Sydney: W. A. Gullich, 1901. Size 13 × 8½, pp. iv. and 218. *Plans, Diagrams, and Illustrations.*

The value of the mineral production in 1900 was 6½ million pounds, an increase of over 2 millions as compared with the production five years previously. Silver, lead, coal and coke, copper, and tin, all show satisfactory increases on the amounts in 1899.

New South Wales. ——

The Year-Book of New South Wales. Compiled by the Editor of the 'Year-Book of Australia,' for circulation by the Agent-General in London, 1902. Size 8½ × 5½, pp. 168. *Map. Presented by the Agent-General for New South Wales.*

New South Wales. **Andrews.**

Report on the Kiandra Lead. By E. C. Andrews, B.A. (New South Wales, Department of Mines and Agriculture. Geological Survey, Mineral Resources, No. 10.) Sydney, 1901. Size 9½ × 6½, pp. 32. *Maps, Sections, and Illustrations. Presented by the Geological Survey, New South Wales.*

New Zealand. ——

Statistics of the Colony of New Zealand for the Year 1900. Wellington, 1901. Size 13 × 8½, pp. xvi. and 550.

Pacific Ocean—Tides. *B. American G.S.* **34** (1902): 17–25, 117–131. **Brownlie.**

The Tides in the midst of the Pacific Ocean. A study by Alexander Brownlie.

Queensland. ——

'The Clarion.' Edited by Randolph Bedford. Queensland Number. [Melbourne, 1901.] Size 19½ × 14½, pp. 62. *Illustrations. Presented by the Chief Secretary, Brisbane, Queensland.*

Queensland. **Ball.**

Report on the Hamilton and Coen Gold Fields. By Lionel C. Ball. Brisbane, 1901. Size 13 × 8½, pp. 28. *Maps.*

Queensland. **Ball.**

Report on the Jordan Creek Gold Field. By Lionel C. Ball. Brisbane, 1901. Size 13½ × 8½, pp. 8. *Map.*

Queensland. **Dunstan.**

Report on Geology of the Dawson and Mackenzie Rivers, with special reference to the occurrence of Anthracitic Coal. By B. Dunstan. Brisbane, 1901. Size 13 × 8½, pp. 28. *Map, Plans, and Sections.*

Queensland. **Rands.**

Fourth Report on the Gympie Gold Field, having special reference to the Inglewood Dyke and the Eastern Leases. By William H. Rands. Brisbane, 1901. Size 13½ × 8½, pp. 18. *Map and Illustrations.*

Queensland. **[Traill.]**

A Queenly Colony. Pen Sketches and Camera Glimpses. [By W. H. Traill.] [Brisbane, 1901.] Size 12½ × 10, pp. viii. and 142. *Maps and Illustrations. Presented by the Agent-General for Queensland.*

An outline of the history of colonization in Queensland, written to accompany reproductions of photographs in the possession of Government departments.

Society Islands—Raiatea. *B S. Neuchateloise G.* **14** (1902): 1–246. **Huguenin.**

Raiatea la Sacrée. Par Paul Huguenin. *With Map and Illustrations.*

Tasmania. ——

Handbook of Tasmania, with List of Reference Works on the Agricultural,

Pastoral, Horticultural, and Mineral Resources of the Colony. Launceston, 1899. Size 8½ × 5½, pp. 32. *Map.*

Victoria. *P.R.S. Victoria* **14** (1902): 153–165. **Kitson.**

Observations on the Geology of Mount Mary and the Lower Werribee Valley. By A. E. Kitson.

Victoria—Mount Macedon. *P.R.S. Victoria* **14** (1902): 185–217. **Gregory.**

The Geology of Mount Macedon, Victoria. By Dr. J. W. Gregory, F.R.S. *With Plates.*

POLAR REGIONS.

Antarctic—German Expedition. *Z. Ges. Erdk. Berlin* (1902): 323–332. **Schott.**

Von der Deutschen Südpolar-Expedition. Aus dem Bericht über die wissenschaftlichen Arbeiten auf der Fahrt von Kiel bis Kapstadt. Von Dr. G. Schott.

Antarctic—Natural History. ——

Report on the Collections of Natural History made in the Antarctic Regions during the voyage of the *Southern Cross*. London, 1902. Size 10 × 6, pp. 344. *Plates and Illustrations. Presented by the Trustees of the British Museum.*

The collections made by members of the Newnes Expedition in various branches of Natural History are here described by a number of specialists. As is well known, Mr. Nicolai Hanson, the zoologist of the expedition, was particularly well fitted for the work he had undertaken, and before his lamented death was indefatigable in collecting the forms of life observed. His premature death was a great loss to science, and had he been spared to return, the results of the expedition, from the point of view of zoology, would have been still greater. As it is, the volume, which includes the notes made by Mr. Hanson in his private diary, marks an important advance in our knowledge of the Southern fauna, and the report on the rock specimens is also of much interest. The work is illustrated by a series of excellent plates.

Antarctic—Swedish Expedition. *Scottish G. Mag.* **18** (1902): 312–314. **Nordenskjöld.**

The Swedish Antarctic Expedition. Some notes of its first month of work. By Otto Nordenskjöld.

Arctic—Ice-conditions. **Garde.**

The state of the ice in the Arctic Seas, 1901. Published by the Danish Meteorological Institute, on invitation of the VIIIth International Geographical Congress. Prepared by V. Garde. (Special print of the nautical-meteorological Annual of the Danish Meteorological Institute.) Size 12½ × 9½, pp. xxiv. *Charts.*

See note in the Monthly Record for July.

Arctic—Russian Expedition. *Petermanns M.* **48** (1902): 66–68, 83–88. **Toll.**

Russische Polar Expedition unter Leitung von Baron Ed. Toll. Bericht über die Fahrt der "Sarja" durch die Kara-See und über die Arbeiten des Jahres 1900. Von Eduard v. Toll.

Arctic—Russian Expedition. *Z. Ges. Erdk. Berlin* (1902): 242–247. **Toll.**

Von der Russischen Polar-Expedition. Berichte des Leiters der Expedition. Baron Ed. Toll.

Greenland. *G. Tidskrift* **16** (1901–1902): 133–142. **Hartz.**

Den Østgrønlandske Expedition 1900. Skibsexpeditionen fra Kap Dalton til Kong Oscars Fjord. Ved N. Hartz.

On the voyage of the *Antarctic* (Amdrup Expedition) along the Greenland Coast.

MATHEMATICAL GEOGRAPHY.

Astronomical Observations. *Ann. Hydrographie* **30** (1902): 152–156. **Wendt.**

Korrespondirende Höhen. Von Dr. Ernst Wendt.

On the determination of the longitude by corresponding, as opposed to equal, altitudes, *i.e.* by altitudes observed at equal hour angles before and after noon.

Astronomy. **Crommelin.**

An Adaptation of Major Grant's Graphical Method of Predicting Occultations to the Elements now given in the Nautical Almanac. By A. C. D. Crommelin. London: Royal Geographical Society, 1902. Size 10 × 6½, pp. 6. *Diagrams.*

Astronomy. **Guyon.**

Un nouveau Planétaire. Par G. Guyon. (Université Nouvelle. Institut Géogra-

phique de Bruxelles, Publication No. 7.) Bruxelles, 1902. Size 10 × 6½, pp. 14. *Diagram.*

Astronomy. ———

The American Ephemeris and Nautical Almanac for the year 1905. First Edition. Washington, 1901. Size 10½ × 7½, pp. viii. and 596.

Globe-Sections. *Z. Ges. Erdk. Berlin* (1902): 59–63. **Maes.**

Ueber Herstellung von Globusscheiben. Von Valère Maes.

Latitude and Longitude. *Naturw. Wochenschrift* 1 (1902): 270–271. **Schmidt.**

Die Ausdrücke "Länge" und "Breite" in der Geographie. Von Prof. Dr. Max C. P. Schmidt.

Traces the development of the idea of length and breadth as applied to the Earth from the time of the early Greeks, with the parallel notion of a right and a left side (north and south).

Lunar Distances. *Rev. Maritime* 153 (1902): 943–963. **Guyon.**

La méthode des distances lunaires. Par le capitaine E. Guyon.

Map-projection. *American J. Sci.* 13 (1902): 245–275, 347–376. **Penfield.**

On the use of the Stereographic Projection for Geographical Maps and Sailing Charts. By S. L. Penfield. *With Illustrations. Also separate copy, presented by the Author.*

The writer urges that greater use should be made of the advantages offered by the stereographic projection.

Map-projection. *J. Manchester G.S.* 17 (1901): 183–185. **Stromyer.**

A Conical Surface Equivalent Projection. By C. E. Stromyer.

Advocates the mapping of the world on a conical equal area projection in a series of zones, the angles of the conical mantles varying with the latitude.

Surveying. **Middleton.**

Surveying and Surveying Instruments. By G. A. T. Middleton. Second Edition. Revised and Enlarged. London: Whittaker & Co., 1902. Size 7½ × 5, pp. 150. *Diagrams. Price 5s. Presented by the Publisher.*

Treats principally of land surveys with chain, level, theodolite and plane-table.

Tables. **McKirdy.**

Time, Tide, and Distances. A Handy Book of Reference for the Shipowner, Underwriter, or Traveller, useful also in the Club House or the Smoking Room. By Commander J. McKirdy. London: J. D. Potter, 1902. Size 10 × 12½, pp. 42. *Map and Movable Diagrams. Price 5s. Presented by the Publisher.*

This shows, in a convenient form for reference, (1) the time of the world as compared with that of Greenwich; (2) the tides round the British coasts and on the eastern route to Japan, with that at London Bridge; (3) Distances from British ports to over 1300 places at home and abroad; (4) tables for conversion of speed and time into distance, and the converse; the first two by means of revolving discs.

PHYSICAL AND BIOLOGICAL GEOGRAPHY.

Bio-geography. **Hutton.**

The Lesson of Evolution. By Frederick Wollaston Hutton. London: Duckworth & Co., 1902. Size 7½ × 5, pp. viii. and 102. *Presented by the Author.*

A sketch of the probable history of life on the Earth.

Geomorphology. *Sitzb. A.W. München* (1902): 17–38. **Günther.**

Ueber gewisse hydrologisch-topographische Grundbegriffe. Von S. Günther.

Glaciers. *Rev. G.* 50 (1902): 238–247. **Rabot.**

Les glaciers et les phénomènes glaciaires. Par Charles Rabot.

Gravity Determination. *Sitzb. A.W. Berlin* (1902): 126–128. **Helmert.**

Dr. Hecker's Bestimmung der Schwerkraft auf dem Atlantischen Ocean. Von F. R. Helmert.

On observations during a voyage to South America in July and August, 1901.

Mountain Systems. *C. Rd.* 134 (1902): 998–1000. **Meunier.**

Observations sur les pôles orogéniques. Note de M. Stanislas Meunier.

On the writer's theory that the mountain-systems of the two hemispheres are arranged symmetrically round two orogenic poles.

Oceanography. *C. Rd.* **134** (1902): 961–964. **Monaco.**

Sur la troisième campagne de la *Princesse Alice II.* Note de S. A. S. le Prince Albert de Monaco.

Oceanography—Atlantic. **Ryder.**

Nautical-Meteorolog. Ann., Danish Meteorolog. I. (1901): xxxi.–lxii.

Some investigations relating to the ocean currents in the sea between Norway, Scotland, and Greenland. By C. Ryder. *With Maps.*

On observations made by the author while in command of one of the Iceland mail steamers.

Oceanography—Atlantic. *C. Rd.* **134** (1902): 1077–1079. **Thoulet.**

Etude d'échantillons d'eaux et de fonds provenant de l'Atlantique Nord. Note de M. J. Thoulet.

Oceanography—Mediterranean. *C. Rd.* **134** (1902): 1459–1460. **Thoulet.**

Sur une série verticale de densités d'eaux marines en Méditerranée. Note de M. J. Thoulet.

Oceanography—Methods. *C. Rd.* **134** (1902): 1385–1387. **Richard.**

Sur une nouvelle bouteille destinée à recueillir l'eau de mer à des profondeurs quelconques. Note de M. Jules Richard. *With Illustration.*

Phenology. **Ihne.**

Phaenologische Mitteilungen (Jahrang 1901). Von E. Ihne. (Sonder-Abdruck aus den Abhandlungen d. Naturhist. Gesellsch., XIV. Bd., Nürnberg.) Size 8½ × 6, pp. 36.

Physical Geography. *Rev. G.* **50** (1902): 312–322. **Meunier.**

Géographie physique et géologie. Par Stanislas Meunier.

Phyto-geography. *Naturw. Wochenschrift* **1** (1902): 253–255. **Vogler.**

Die Bedeutung der Verbreitungsmittel der Pflanzen in der alpinen Region. Von Dr. Paul Vogler.

The author shows the preponderance among strictly alpine plants of the forms whose seeds are disseminated by the agency of wind.

River-gorges. *C. Rd.* **134** (1902): 1160–1163. **Brunhes.**

Sur un principe de classification rationnelle des gorges creusées par les cours d'eau. Note de M. Jean Brunhes.

Snow. *Meteorolog. Z.* **19** (1902): 205–211. **Bührer.**

Ueber den Einfluss der Schneedecke auf die Temperatur der Erdoberfläche. Von W. Bührer.

Tidal Bore. *B. American G.S.* **34** (1902): 146–149. **Booraem.**

Note on the Tidal Bore. By John V. V. Booraem. *With Diagrams.*

Volcanoes. *Rev. Scientifique* **17** (1902): 737–744. **Taquin.**

La théorie des volcans. Par M. A. Taquin.

The author attributes volcanic eruptions to electric influences, and holds that they are in close relation to the meteorological conditions of the globe.

ANTHROPOGEOGRAPHY AND HISTORICAL GEOGRAPHY.

Anthropogeography. *G.Z.* **8** (1902): 266–285. **Halbfass.**

Die Binnenseen und der Mensch. Eine kulturgeographische Skizze. Von Wilhelm Halbfass.

Commercial—Bamboos. *Rev. G.* **50** (1902): 404–423. **Rivière.**

Les bambous, Répartition geographique, végétation, usages. Par Ch. Rivière.

Commercial Geography—Cacao. **Preuss.**

Société d'Études Coloniales de Belgique. Le Cacao. Sa Culture, Sa Preparation. Par le Dr. Paul Preuss. Extrait du Bulletin de la Société. Bruxelles: A. Lesigne, 1902. Size 9½ × 6½, pp. 128. *Illustrations. Presented by the Société d'Études Coloniales.*

Dr. Preuss's reputation as an economic botanist is a voucher for the accuracy of this monograph, which is based on the author's own observations during his journey in Central and South America. It is extracted from the larger work, in which the results of that journey were described.

Ethnology—Pygmies. *Globus* **81** (1902): 325-327. **Kollmann.**

Pygmäen in Europa und Amerika. Von J. Kollmann.

Historical—Early Map. *B.S.G. Italiana* **3** (1902): 438-449. **Magnocavallo.**

La carta "de mari mediterraneo" di Marin Sanudo "il Vecchio." Nota del Prof. A. Magnocavallo. *With Plates.*

GENERAL.

Anglo-Jewish Association.

The Thirty-first Annual Report of the Anglo-Jewish Association, 1901-1902. London: the Anglo-Jewish Association, 1902. Size 8½ × 5½, pp. 112. *Map. Presented by the Association.*

The map shows the schools throughout Europe subsidized by the Anglo-Jewish Association.

Bibliography. **Knox.**

Geographical Index (Extra-European) to Books, Periodicals, &c. Compiled in the Intelligence Division, War Office. By Alexander Knox, B.A., Map Curator. London: Harrison & Sons, 1901. Size 10½ × 7, pp. xiv. and 72.

Bibliography—Science.

Catalogue of Scientific Papers (1800-1883). Supplementary Volume. Compiled by the Royal Society of London. Vol. xii. London: C. J. Clay & Sons, 1902. Size 11½ × 8¼, pp. xxxii. and 808. *Presented by the Royal Society.*

In this volume (edited by the late Mr. G. Griffith) papers are catalogued which appeared from 1800 to 1883 in periodicals not indexed in the main work. Of these over 350 have been dealt with, and as they include many not generally known beyond the country in which they are published, the references to papers in them will bring to light much work that has hitherto been passed over by students. The literature of the years 1883-1900 will be dealt with in subsequent volumes, completing the work to the end of last century.

British Empire. *Nineteenth Century* **51** (1902): 716-731. **Johnston.**

Problems of the Empire. By Sir Harry H. Johnston, K.C.B.

Education.

Board of Education. Special Reports on Educational Subjects. Volume 8. Education in Scandinavia, Switzerland, Holland, Hungary, &c. London: Eyre & Spottiswoode, 1902. Size 9½ × 6, pp. viii. and 704. *Map and Diagram. Price* 3*s.* 2*d.*

Deals with the general organization of education in the different countries, with brief descriptions of the school curricula. A section deals with school journeys in Yorkshire, etc.

Educational—Ordnance Maps. *G. Teacher* **1** (1902): 61-67. **Geikie.**

The Use of Ordnance Maps in Teaching Geography. By Sir Archibald Geikie, F.R.S.

Europe and Asia. **Norman.**

All the Russias. Travels and Studies in Contemporary European Russia, Finland, Siberia, The Caucasus, and Central Asia. By Henry Norman. London: W. Heineman, 1902. Size 9½ × 6, pp. xvi. and 476. *Maps and Illustrations. Price* 18*s. net.*

The object of this work, which is based on fifteen years' study and four journeys in European and Asiatic Russia, is "to present a picture of the aspects of contemporary Russia of most interest to foreign readers, with especial reference to the recent remarkable industrial and commercial development of Russia."

French Colonies. **Fallot.**

E. Fallot. L'Avenir Colonial de la France. Études pratiques sur les principes de la colonisation et la situation économique des colonies françaises et étrangères. Paris: Ch. Delagrave. Not dated. Size 7½ × 5, pp. viii. and 550. *Maps. Price* 5*s.*

A useful *résumé* of the present condition and prospects of the French colonies, with comparisons with those of other nations.

German Colonies.

Weissbuch. Zweiundzwanzigster Theil. Berlin: Carl Heymanns Verlag, 1902. Size 12½ × 9, pp. 112, 4, and 352.

Livingstone College.

Livingstone College Calendar and Year-Book, containing a Record of a Year's Progress in matters of Health, Outfit, and Travel. London: Travellers' Health Bureau. Size 7½ × 5, pp. 90. *Illustrations. Price* 6*d.*

Mosquito Destruction. **Ross.**

Mosquito Brigades and how to organise them. By Ronald Ross. London; George Philip & Son, 1902. Size 9 × 5½, pp. vii. and 100. *Price* 3*s. net. Presented by the Publishers.*

Shows in a concise form the way in which the apparently hopeless task of mosquito destruction may be carried out with prospect of success. The motto adopted as pointing to the most important means of fighting the mosquito pest is "No stagnant water."

Photography. *J. African S.* (1902): 302-311. **Lee.**

Photography as an Aid to the Exploration of New Countries. By J. Bridges Lee. *With Illustrations.*

Principles of Geography. **Mello.**

Les Lois de la Geographie. 1re Étude. I. Introduction Générale. II. La Géophysique Statique. III. Bibliographie Systématique de la Géophysique. Par Carlos de Mello. Berlin: R. Friedlander & Son, 1902. Size 9 × 6, pp. viii. and 360. *Illustrations. Price* 12*s.*

This makes no claim to be a systematic text-book, but treats of the principles of geography under certain special aspects. The author advocates a synthetic as opposed to an analytical treatment of the subject, and gives his views as to what he calls the laws of terrestrial asymmetry and the mutual interdependence of the surface features of the Earth. An extensive chronological bibliography is added, serving in part as a guide to the historical development of geographical theory, but including sections on special features—rivers, valleys, lakes, etc. It is to be completed at a future date by further special sections.

South Africa and India. *Nineteenth Century* **51** (1902): 706-715. **Griffin.**

South Africa and India. By Sir Lepel Griffin, K.C.S.I.

Recommends an organized immigration of Indian settlers in South Africa as the only satisfactory means of supplying an adequate population.

Spanish Language. **De Arteaga.**

Practical Spanish. A Grammar of the Spanish Language, with exercises, materials for conversation, and vocabularies. By Fernando de Arteaga y Pereira. 2 Parts. Part i. Nouns, Adjectives, Pronouns—Exercises. Part ii. Verbs, etc., with copious vocabularies. London: John Murray, 1902. Size 7½ × 5, pp. (Part i.) viii. and 258; (Part ii.) x. and 362. *Price* 7*s.* 6*d. Presented by the Publisher.*

A special feature in this grammar is the immense trouble which is taken to explain, by means of examples, both the regular and idiomatic uses of Spanish grammatical constructions. This is no doubt valuable from certain points of view, but the resulting diffuseness detracts somewhat from the practical value of the book to other than serious students. The fundamental principle underlying certain usages is sometimes masked by the elaborate distinctions introduced, while on the other hand uses not strictly parallel are occasionally classed together.

NEW MAPS.

By E. A. REEVES, *Map Curator,* **R.G.S.**

EUROPE.

England and Wales. **Ordnance Survey.**

Ordnance Survey of England and Wales:—Revised sheets published by the Director-General of the Ordnance Survey, Southampton, from July 1 to 31, 1902.

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Hill-shaded map, printed in colours, in sheets (5 and 6). 1*s.* 6*d.*

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and N.W.), S.E., 10 N.W., S.W., 13 N.E., S.E., 14 S.E., 15 N.E., S.E., 16 S.E., 23 N.W., N.E., 24 S.E., 25 N.W., 56 N.W. **Huntingdonshire**, 6 N.W., 7 S.W., 8 S.E., 9 N.W., 12 S.W., 13 N.E., 14 S.W., S.E., 15 N.E., S.W., 21 S.E., 22 N.E., S.W., 24 S.E., 26 N.W., 28 N.W. **Monmouthshire**, 1 N.W., N.E., 6 N.W. (8 N.E. and 9 N.W.) (10A S.E. and 11A S.W.), 11 N.W., N.E. (11A S.W. and 10A S.E.), 28 S.E., 29 N.E., 30 S.E., 38 N.W., N.E. **Staffordshire**, 44 N.E., 47 N.W. 1*s. each.*

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Cambridgeshire, I. 15, 16; IV. 2, 3, 15; VII. 7, 11, 12; XVII. 13, 15, 16; XX. 16; XXI. 8, 12, 15, 16; XXII. 1, 3, 4, 6, 8, 9, 10, 12, 13; XXV. 4, 6, 7, 10, 11, 12; XXVI. 1; XXXIII. 6; XLIV. 16. **Dorsetshire**, VII. 9, 13; XXII. 4, 11, 13, 15, 16; XXXI. 1, 4, 5, 7, 9, 10, 11, 12, 13, 14, 15, 16; XXXII. 9, 10; XL. 2, 3, 8; XLI. 2, 5, 6, 10, 13, 14; XLVIII. 1, 2, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16; XLIX. 5, 9, 10; LIV. 4. **Gloucestershire**, X. 15; XII. 9, 13; XXV. 12, 15; XXX. (3 and 7); XXXIII. 1, 2, 5, 8; XXXIV. 1, 2, 3, 4, 6, 7, 8; XXXV. 1, 16; XXXVII. 9, 14. **Huntingdonshire**, XXVII. 16. **Montgomeryshire**, XXIII. 10, 11, 12, 14, 15; XXIV. 13; XXIX. 14, 15, 16; XXX. 1, 5, 6, 7, 8, 12; XXXVI. 2, 4, 6, 8; XLII. 1, 2, 3. **Shropshire**, XXXIV. 6, 7, 14, 15; XXXVI. 7, 8; XXXVII. 7, 9, 10, 11, 14; XXXIX. 13; XL. 2, 4, 6, 7, 8, 9, 10, 12; XLI. 1, 2, 3, 5, 6, 7, 9; XLV. 13; XLVI. 12. **Staffordshire**, XXVIII. 3, 4, 8; XLIX. 4, 8; L. 3, 5, 13; LI. 6, 10, 13, 15, 16; LII. 15; LVI. 3, 4, 6, 7, 8, 14, 15, 16; LVII. 2, 4, 5, 7, 9, 10, 11, 12, 14, 15, 16; LVIII. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16; LIX. 1, 2, 4, 7, 8, 9, 10, 13, 14, 15; LX. 1; LXII. 8. **Warwickshire**, II. 4, 7, 8, 15; III. 1; IVA. 15. **Worcestershire**, LIII. 15; LV. 9 (Areas of Bredon Parish only). **Yorkshire**, CCXCVI. 6; CCXCVII. 5, 9, 13. 3*s. each.*

(*E. Stanford, London Agent.*)

Bulgaria. **Kassner.**

Verteilung der jährlichen Niederschläge in Bulgarien. Von Dr. C. Kassner. Scale 1 : 1,500,000 or 23·6 stat. miles to an inch. *Petermanns Geographische Mitteilungen*, Jahrgang 1902, Tafel 11. Gotha: Justus Perthes. *Presented by the Publisher.*

Historical Atlas. **Poole.**

Historical Atlas of Modern Europe from the Decline of the Roman Empire; comprising also maps of parts of Asia and of the New World connected with European History. Edited by Reginald Lane Poole, M.A., PH.D., Fellow of Magdalen College, and Lecturer in Diplomatic in the University of Oxford. Part XXX. Oxford: The Clarendon Press; London, Edinburgh, Glasgow, and New York: Henry Frowde, M.A.; Edinburgh: W. & A. K. Johnston. 1902. *Price* 3*s.* 6*d. each part. Presented by the Clarendon Press.*

With the publication of the present part this excellent historical atlas of modern Europe is completed, and the editor and publishers may be congratulated on having produced a work that supplies a long-felt need in this country, and one that will doubtless be highly appreciated by all students of historical geography.

The editor in his preface, which appears with this part, fully acknowledges his indebtedness to those whose works he has consulted and which have been made use of in the preparation of this atlas, the principal of these being the famous Spruner-Menke 'Hand-Atlas zur Geschichte des Mittelalters und der neueren Zeit,' Droysen's 'Allgemeiner Historischer Hand-Atlas,' Longnon's 'Atlas Historique de la France,' and the volume of maps to accompany Freeman's 'Historical Geography of Europe.' However, the maps in certain sections, specially those illustrating Byzantine, Asiatic, and colonial history, and the British Isles, are in most respects independent of any previous atlas. The latter, which number altogether sixteen, are exceptionally valuable, and far more complete than any maps of a similar character. As mentioned in the title, the period embraced commences with the decline of the Roman Empire, and as a definite year for its close that selected is 1897, the sixtieth year of the reign of the late Queen Victoria. There is but one exception to this, and that is South Africa, in which case it has been considered desirable to add a supplementary map showing the historical development of that region previous to the annexation of the Boer Republics in 1900. The atlas contains altogether ninety maps, all of which are accompanied by letterpress. A list of the maps is given with this part, together with the authors' names, which are alone sufficient to inspire confidence in the work.

The maps contained in this closing part are: No. 41, Germany, 1648–1795, by C. Grant Robertson, M.A.; No. 84, India in 1782 and 1845, by Prof. Oman; No. 90, South Africa previous to the suppression of the Boer Republics, by G. Geoffrey Robinson, M.A.

Vienna. **Hartleben.**

Plan der Reichshaupt- und Residenzstadt Wien mit Angabe der neuen Bezirkseintheilung und den früheren Gemeindegrenzen. Scale 1 : 20,000 or 386 yards to an inch. Vienna : A. Hartleben.

A new edition of a good clear plan of Vienna, printed in colours.

Relief Map. **Morrell.**

Nature-Study : Realistic Geography. Model based on the 6-inch Ordnance Survey. Designed by G. Herbert Morrell, M.A. London : Edward Stanford. *Price* 3*s*. *Presented by the Publisher.*

Teachers of geography are increasingly realizing the importance of training their pupils in map-reading, and it is encouraging to find how many schools now possess the Ordnance Survey sheets of the locality in which they are situated, for a constant comparison of a real scene with its map-representation is one of the surest means by which children can learn to grasp the meaning of all maps. By this method children soon learn to understand a map, in so far as the horizontal is concerned, but the power of interpreting the modes of representing relief, conventionally adopted in maps, can only be very gradually acquired.

It is with the object of helping children to realize relief, as represented by contour-lines, that a model of the country surrounding Streatley-on-Thames has been designed by Mr. G. H. Morrell, M.A. The model is composed of layers of cardboard cut out according to the contour-lines, each representing 50 feet of elevation, which are marked on the war-game edition of the 6-inch Ordnance Survey of Berkshire, and then superimposed in their proper position. It is sold in a portfolio, which also contains several pieces of cardboard, each stamped with a contour-line drawn from the same map, but not cut out, so that a second model of the same district could be easily constructed.

Models of this kind have for years been regularly constructed by the pupils at Dr. Beust's school near Zürich, and occasionally by those of a few other schools and colleges in this country as well as abroad, but the time and trouble involved in separately tracing the required lines on to pieces of cardboard may have prevented the method from being more widely adopted. In some schools abroad the practice has even been partially relinquished, on the ground that it has become rather a manual than a geographical training, while it is also well to remember that there is a danger of such models emphasizing the *terraced* idea of relief a child is all too ready to derive from the study of a contoured map.

The constant comparison of the model with the reality and the use of a little plasticine for finally obliterating the terraced effect would probably counteract the latter evil, and though it would be unwise to devote a great deal of time to this occupation, a child would certainly be far better able to appreciate the significance of contour-lines after he had constructed, or watched the construction of, one of these models, than he could without such a practical demonstration.

ASIA.

Central Asia. **Hedin.**

Uebersicht meiner Reisen in Zentralasien. Von Dr. Sven v. Hedin. Scale 1 : 7,500,000 or 118·3 stat. miles to an inch. *Petermanns Geographische Mitteilungen*, Jahrgang 1902, Taf. 15. Gotha : Justus Perthes. *Presented by the Publisher.*

A small-scale general map of Central Asia, taken from sheet No. 62 of Stieler's Hand Atlas, upon which have been laid down the routes taken by Dr. Sven Hedin on his recent and earlier journeys. Although only a preliminary map, it serves to illustrate generally the short paper which it accompanies.

Indian Government Surveys. **Surveyor-General of India.**

Indian Atlas, 4 miles to an inch. Sheets : 23 N.W., parts of Bhávnagar, Jetpur, Pálitána, and Minor Native States of Káthiáwár Agency, and district Ahmedabad (Bombay Presidency), additions to 1897, 1901. 76 N.E., parts of districts Kurnul, Nellore, and Kistna (Madras Presidency), additions to 1899. 76 S.E., parts of districts Nellore, Kistna, and Kurnul (Madras Presidency), additions to 1899. 77 S.W., parts of districts Cuddapa and North Arcot (Madras Presidency), and Kolar (Mysore State), 1901. 86 S.W., parts of districts Kheri, Sitapur, and Bahraich (Oudh), and of Nepal, additions to 1898, 1899.—Bombay Survey, 1 mile to an inch. Sheet 231, districts Poona and Ahmednagar, Season 1878–79, additions and corrections up to February, 1898, 1901.—Burma Survey, 1 mile to an inch. Preliminary edition. Sheet 145 (new series), district Shwebo, Season 1892–96, 1901.—Central India and Rajputana Survey, 1 mile to an inch. Sheets : 120, parts of Native States, Idar, and Danta (Bombay Presidency), and of Sirohi and Udaipur (Rajputana Agency), Season 1880–81,

1901; 267, parts of Kotah, Bundi, and Udaipur (Rajputana Agency), Seasons 1869-71, 1901; 278, parts of Indore Gwalior, Dewás, and Dhár, Native States, and Mánpur (Central India Agency), Season 1873-74, additions and corrections up to April, 1895, 1901; 408, parts of Bhopal (Central India Agency), and district Saugor (Central Provinces), Seasons 1854-57, 1862-63, and 1871-72, 1901; 451, parts of districts Mandla and Jubbulpore (Central Provinces), and Native State of Rewah (Central India Agency), Seasons 1860-61 and 1873-74, 1901.—Lower Provinces Revenue Survey, 1 mile to an inch, district Monghyr. Sheets 5 and 6, with additions to boundaries, 1897, 1901.—Lower Provinces, Bihar—Bengal; district Shahabad, 4 miles to an inch, with additions and corrections to railways, boundaries, roads and canals up to April, 1900, 1901.—Western Bengal, 8 miles to an inch. Sheet 9, containing district Balasore and parts of districts Midnapore, Cuttack, Singhbhum, Ranchi, Manbhum, Bankura, Hughly, and Howrah, Mayurbhanja, Keonjhar, Talcher, Pallahara, and Dhenkanal, with addition of railway and corrections to boundaries up to May, 1900, 1901.—Madras Survey, 1 mile to an inch; 2nd edition, sheet 76, parts of districts Mysore, Hassan, and Tumkur (Mysore), Season 1882-83, with corrections to boundaries up to February, 1890, 1901.—North-Western Provinces and Oudh Survey, 1 mile to an inch. Sheet 119, districts Lucknow, Unao, Bara Banki, Sitapur, and Hardoi, Seasons 1862-64, with additions and corrections up to April, 1898, 1901.—Northern Trans-Frontier, 2 miles to an inch; 2nd edition. Sheet 35, parts of Dir, Buner, Swát and Indus Valleys, Seasons 1888-98, 1899.—Sind Survey, 1 mile to an inch. Sheet 9, district Kurachi, Season 1898-99, 1901.—Survey of India Department, 2 miles to an inch; 2nd edition. Sheets: 19, parts of Kalat (Baluchistan) and Sind, Seasons 1897-99, 1901; 21 and 40 (Sind), Season 1898-99, 1901; 71 (Sind), Seasons 1897-99, 1901; 79 (Sind), Season 1899-1900, 1901.—Map of Sundurbuns, compiled under the direction of the Commissioner in the Sundurbuns, by James Ellison, Surveyor of the Sundurbuns, 1873, 4 miles to an inch, with additions and corrections up to 1891; 2 sheets, 1901.—Index to the Standard Sheets of the Central Provinces, 50 miles to an inch. Additions to 1901.—Index to the Standard Sheets of the North-Western Provinces and Oudh, 50 miles to an inch. Additions to 1901. *Presented by H.M. Secretary of State for India, through the India Office.*

AFRICA.

South Africa. **Hausermann.**

Carte des Missions Catholiques du Sud Africain. Scale 1 : 4,000,000 or 63 stat. miles to an inch. *Supplément au Journal Les Missions Catholiques*, 6 Juin, 1902. Paris: R. Hausermann.

The whole of the African continent south of Lake Nyasa and the Zambezi is shown upon this sheet, which is intended to form part of a general map of the continent upon the same scale, of which other sheets have already appeared. It is printed in colours—water blue, hills brown, and lettering black, and shows the boundaries of Catholic mission vicarials and prefectures, and the positions of Catholic mission stations in red. The map is given as a supplement to *Les Missions Catholiques* for June 6 of the present year.

AMERICA.

Canada. **Surveyor-General's Office, Ottawa.**

Sectional Map of Canada. Scale: 190,080 or 3 stat. miles to an inch. Humboldt Sheet (45), West of Second Meridian. Revised to June 21, 1902. Surveyor-General's Office, Ottawa, 1902. *Presented by the Surveyor-General of Canada.*

This sheet includes the area between lat. 51° 48′ and 52° 30′ N., and long. 104° 15′ and 106° W.

GENERAL.

World. **Scobel.**

Handels-Atlas zur Verkehrs- und Wirtschaftsgeographie. Für Handelshochschulen, Kaufmännische, gewerbliche und landwirtschaftliche Lehranstalten, sowie für Kaufleute und Nationalökonomen. Herausgegeben von A. Scobel. Bielefeld und Leipzig: Velhagen & Klasing, 1902. *Price* 5*m.* 50 *pf. Presented by the Publishers.*

This little commercial atlas contains altogether forty pages of maps, plans, and diagrams, having reference to all the important branches of commercial geography. The maps are clearly drawn and carefully printed in colours. They are not overcrowded, and the main object of each and the special features it is intended to illustrate are clearly brought out. Notwithstanding the small scale of the maps, a

great deal of information is given, although of a very general character. Amongst those deserving special notice are the maps showing the distribution of minerals, useful plants, and wild and domestic animals. As might be expected, being a German atlas, there are many more maps of Germany than of any other country.

CHARTS.

Admiralty Charts. **Hydrographic Department, Admiralty.**

Charts and Plans published by the Hydrographic Department, Admiralty, during May and June, 1902. *Presented by the Hydrographic Department, Admiralty.*

No.	Inches.	
3227 to 3238		Atlas of monthly wind charts for coasts of South America. 7*s.*
1344		North Atlantic. Tidal streams amongst the Færoe islands. 1*s.* 6*d.*
3258 m =	6·88	England, east coast:—River Tyne, Jarrow Slake to Elswick. 1*s.* 6*d.*
2669 m =	0·5	The Channel islands and adjacent coast of France. 3*s.*
2644 m =	0·5	France, north coast:—Ile d'Ouessant to Plateau des Roches Douvres. 3*s.*
3264 m =	3·0	Newfoundland, south coast:—St. Mary's harbour and adjacent approaches. 2*s.*
3263 m =	3·0	Newfoundland, south coast:—Salmonier river and Colinet harbour. 2*s.* 6*d.*
3266 m =	2·96	Newfoundland, south coast:—Long harbour and St. Croix bay and adjacent anchorages. 1*s.* 6*d.*
3257 m =	0·8	Canada. Lake Huron:—Chantry island to Cove island. 3*s.*
3253 m =	var.	South America, west coast:—Plans on the Coast of Chile. 1*s.* 6*d.*
3268 m =	7·1	Central America, west coast:—Panama road. 2*s.* 6*d.*
3271 m =	3·98 5·97	Vancouver island and British Columbia. Plans in Broughton and Johnstone straits:—Alert and Blinkinsop bays. 1*s.* 6*d.*
625 m =	0·4	Africa, west coast:—River Congo. 1*s.* 6*d.*
3252 m =	0·25	Central Africa:—Victoria Nyanza (northern portion). 2*s.* 6*d.*
3255 m =	6·0	Central Africa. Victoria Nyanza:—Entebbe bay. 1*s.* 6*d.*
3256 m =	6·9	Central Africa. Victoria Nyanza:—Port Florence. 1*s.* 6*d.*
3267 m =	3·74 4·0	Plans on the west coast of India:—St. Mary isles, Mangalore harbour. 1*s.* 6*d.*
976 m =	2·9	Philippine islands:—Manila bay. Plan added: port of Manila.
3283 m =	2·0 6·0	Philippine islands, west coast:—Ports Salomague and Sual. 1*s.* 6*d.*
3274 m =	0·2	China. Upper Yang tse kiang. Tung ting lake and Siang river. 2*s.* 6*d.*
3224 m =	1·62	Japan, Kiusiu, north coast:—Iki island. 2*s.* 6*d.*
1596		Harbours and anchorages on the coast of Italy. Plans added:—Port Salerno, Port Torre del Greco.
1292		South America, east coast. Plan added:—Atlas anchorage.
632		Africa, west coast. New plan:—Angra Pequeña.
934		Eastern archipelago. New plan:—Ketapang bay.
3131		Anchorages in New Hebrides islands. Plans added:—Talomaco and De la table anchorages. Requin bay.

(*J. D. Potter, Agent.*)

Charts Cancelled.

No.	Cancelled by	No.
2669 *a*, *b* Channel islands, and adjacent coast of France, two sheets.	New chart. Channel islands and adjacent coast of France (one sheet)	2669
2644 Ile d'Ouessant to les Sept Iles.	Ile d'Ouesssant to Plateau des Roches Douvres	2644
1287 Chañaral, Choros and Apolillado bays. Plans on this sheet.	Choros and Chañaral bays and Apolillado cove, on new sheet	3253
2261 Panama roadstead. Plan on this sheet.	New plan. Panama road	3268
1544 Naos anchorage. Plan on this sheet.		

No.	Cancelled by	No.
2067 Alert bay and entrance of Nimpkish river on this sheet.	New plan on sheet	3271
625 River Congo from the entrance to Matadi. Plan: Turtle cove.	River Congo, from the entrance to Matadi .	625
746 Mangalore or Kodyal Bandar. Plan on this sheet.	New plan on sheet	3267
2454 Plan of port Sual on this sheet.	New plan. Port Sual on sheet	3283
1115 Tung ting lake. Plan on this chart.	New plan. Tung ting lake and Siang river	3274

Charts that have received Important Corrections.

No. 2793, England, south coast:—Cowes harbour. 3129, White sea:—Yugorski strait. 2297, Baltic sea, Gulf of Bothnia, sheet 2:—Hango head to South Quarken. 2298, Baltic sea, Gulf of Bothnia:—Nystad light to Stor Fiärd. 185, Germany, north coast:—Port Swinemünde and approaches to Stettin. 1506, France, south coast:—Port and roadstead of port Vendres. 2471, United States, east coast:—New London harbour. 2854, Harbours in the Gulf of Mexico:—Vera Cruz. 1938, South America, east coast:—River Uruguay. 553, South America, east coast:—Cape Dos Bahias to Tova island. 2885, United States, west coast:—San Diego bay, etc. 2839, United States, west coast:—Columbia river. 1456, Africa, west coast:—River Cameroon with Ambas islands. 705, Madagascar:—Pasindava bay to Nosi Shaba. 746, India, west coast, sheet 9:—Mulki to Mount Dilli. 69, Ceylon:—Pambam pass. 755, Bay of Bengal:—False point anchorage, etc. 942A, Eastern archipelago, eastern portion, including Flores, Banda, and Arafura seas. 2636, Philippine islands:—Strait of Makassar, north part. 1258, Korea:—Approaches to Séoul, etc. 532, Japan:—Simonoseki strait. 1041, Kamchatka:—Avatcha, outer bay. 1670B, Australia, east coast:—Moreton bay, sheet 2. 2422, Australia:—Torres strait, north-east and east entrances, with outlying reefs. (*J. D. Potter, Agent.*)

Chile. **Oficina Hidrografica, Valparaiso.**

Golfo de Quetalmahue, Bahia de Ancud, y Canal de Chacao (No. 93). Scale 1: 100,000 or 1·5 stat. mile to an inch. Oficina Hidrografica, Marina de Chile, Valparaiso. *Presented by the Director de la Oficina Hidrografica, Valparaiso.*

North Atlantic Ocean and Mediterranean Sea. **Meteorological Office, London.**

Pilot Chart of the North Atlantic and Mediterranean for August, 1902. London: Meteorological Office. *Price* 6*d*. *Presented by the Meteorological Office, London.*

United States Charts. **United States Hydrographic Office.**

Pilot Chart of the North Atlantic Ocean for July, and of the Pacific for August, 1902. U.S. Hydrographic Office, Washington, D.C. *Presented by the U.S. Hydrographic Office.*

PHOTOGRAPHS.

North-East Africa. **Bright.**

Seventy-five Photographs of Egypt and the country between the Upper Nile and Southern Abyssinia. Taken by Major R. G. T. Bright, C.M.G. *Presented by Major R. G. T. Bright, C.M.G.*

These photographs supplement those previously presented by Major Bright, which were noticed in the *Geographical Journal* for August, 1901, and were also taken by him during his journey from the Upper Nile to the frontier of Southern Abyssinia in 1899. As will be seen by the titles, some of the subjects are of considerable interest. It is greatly to be regretted that the photographs taken by Major Bright on his recent and more extended journey in this part of Central Africa were all lost, owing to the great difficulties of transport and privations which he and his leader, Major Austin, met with upon the latter part of their journey.

(1) The palace, Khartum; (2) Khalifa's house, Omdurman; (3) A house in the Khalifa's harem; (4) House of Khalifa's head wife, Omdurman; (5) Mahdi's tomb, Omdurman; (6) Sudanese native officer and interpreter; (7) Sudanese soldiers from Latuka; (8) Sudanese soldiers from Latuka (non-commissioned officers); (9) Group

of 11th Sudanese; (10 and 11) Wash-out on the Sudan railway, near Shendi; (12) Group of Abyssinians; (13) Abyssinian homestead at Goré; (14) Abyssinian houses at Goré; (15) Abyssinian priest at Goré; (16) An Abyssinian messenger; (17) Abyssinian soldiers and native children; (18) Abyssinian officials and soldiers; (19) Abyssinian officer with Galla slaves; (20) Abyssinian official with his secretary and shield-bearer; (21) Abyssinian hut at Buré; (22 and 23) Camp at Buré; (24) Crossing river Baro into Abyssinia; (25) River Baro and Abyssinian mountains; (26) Crossing river Baro; (27) River Baro in the mountains; (28) Skinning hippopotamus on Baro river; (29) Gorge of the river Baro; (30) Nuer village on Baro river (in flood); (31) Nuer village; (32) Nasser fort; (33) Nuers in the soldiers' lines at Nasser fort; (34) An old sheikh at Nasser fort; (35) A Nuer sheikh; (36) Anuak village on Baro river; (37 and 38) Buying food from Anuaks; (39) Anuak stockade; (40) Anuak men; (41) Anuak women; (42 and 43) Groups of Anuak girls; (44) Anuaks drying fish in the swamps; (45) A Galla princess and lady's maid; (46) Galla musicians; (47 and 48) Galla women at work in the fields; (49 and 50) The Barrage, Assuan; (51) Sluice gates, Barrage, Assuan; (52) Temple of Philæ, Assuan; (53) A Shilluk; (54) Shilluks taken near Fashoda; (55) Fashoda from White Nile; (56) Gunboat on Nile; (57) Camels in native boat, towed alongside gunboat on White Nile; (58) Stern of native boat on the Nile; (59) Mules on native boat on White Nile; (60) Wood cut for steamer on White Nile; (61) Belgian steamer on White Nile; (62) Canoe on Sobat river; (63) Natives praying for protection on approach of steamer, river Sobat; (64) Crossing river Pibor in Berthon boat; (65 and 66) Crossing the Gelo river; (67) Swahili soldiers; (68) Swahili drummers on the march; (69) Half of "Faidherb" ready for transport; (70) Front view of soldiers and sailors passing wood into steamer; (71) River Aluro in flood; (72) Group of Gehadia; (73) Gehadia, transport attendants; (74) Sikh native officers who accompanied Colonel Macdonald's expedition; (75) Camp in Gumbela.

South America. **Conway.**

Thirty-four Photographs of the Southern Andes. Taken by Sir Martin Conway. *Presented by Sir Martin Conway.*

Sir Martin Conway's travels in the Southern Andes, during which these photographs were taken, and his ascent of Mount Aconcagua were described in the *Geographical Journal* for July, 1899. The photographs taken from great altitudes on Aconcagua are specially interesting, although, like the others, they are small in size. The following is a list of the titles:—

(1) Looking south-west from halfway up Mount Sarmiento; (2) The north Sarmiento glacier; (3) The base of Mount Sarmiento, with the north and west glaciers; (4) Slopes of Mount Sarmiento from the north-west, the summit hidden in clouds; (5) The middle slopes of Mount Sarmiento, the summit hidden in clouds; (6) Mount Sarmiento, the summit hidden in clouds; (7 and 8) In Cockburn channel; (9) Cockburn channel from Mount Sarmiento; (10) Cockburn channel from the ridge of Mount Sarmiento; (11) The Patagonian pampa, near Otway water; (12) Mules climbing a *débris* slope in the Horcones valley; (13) Fording the Horcones torrent in the early morning; (14) The Horcones from Conway's middle camp on Aconcagua; (15) Looking down the Horcones valley from the side of Aconcagua; (16) From high up on Aconcagua, looking at Mercedario; (17) Looking westward from the top of the gully, Aconcagua; (18) Conway's base camp at the foot of Aconcagua; (19) Ice-terraces formed by a frozen stream, opposite Conway's base camp at the foot of Aconcagua; (20) From the summit ridge of Aconcagua (about 23,000 feet), looking over the Argentine Republic; (21) From foot of Aconcagua; (22 and 23) Sandy Point; (24) A street in Sandy Point; (25) Sandy Point from fire station; (26) In the Magellan straits; (27) A Patagonian flock of sheep; (28) Sheep-shearing by machinery, Otway station: (29) The Patagonian pampa, near Otway station; (30) A Patagonian ranche; (31) Lunch on the Patagonian pampa; (32) Caravan halting on the Cumbre, the Torlosa peak in the background; (33) Caravan above Portillo Cumbre; (34) The Beagle hills, near Fitzroy channel.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.

MAP OF ASIA MINOR

TO ILLUSTRATE THE PAPER BY

Professor W. M. RAMSAY

Scale of Miles

10 0 10 20 30 40 50 60 70 80 90 100

Natural Scale 1:2,500,000 or 1 inch = 39·45 miles

Secant Conical Projection.

Heights in feet. Railways .....

25 26 27 28 29 30 31 32

42 41 40 39 38 37 36

B L A C (P O N T U

CONSTANTINOPLE (BYZANTIUM)

BOSPHORUS

SEA OF MARMARA (Propontis)

Samothraki

Gulf of Xeros

Gallipoli

Imbros

Lemnos

DARDANELLES (Hellespontus)

TROY (Ruins)

Mitilini (Lesbos)

Khios

Samos

Naxos

Kos

Gulf of Kos

RHODES (Rhodus)

Karpathos

Gulf of Adalia

AEGEAN SEA (MARE EGAEUM)

MEDITERRANEAN

Smyrna

R. Gediz

R. Meander

Ajasluk (Ephesus)

Kutaia

Murtana (Perga)

Mucad D. (Temnos)

Kerasun

Sakaria

Longitude East

Published by the Roya

32 33 34 35 36 37 38 39

42 41 40 39 38 37 36

C K S E A

S. EUXINUS

Sinope (Sinob)

C. Bafra

PAPHLAGONIA

Kiangri

Amasra

Tuz Cheulu (L. Tatta)

Konia (Iconium)

Klisschissar (Tyana)

Ak Gol

Tarsus

Adana

Mersina

Alexandretta G. (Issicus Sinus)

R. Jihan

R. Sihun (Sarus)

MESOPOTAMIA

SYRIA

A N S E A

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